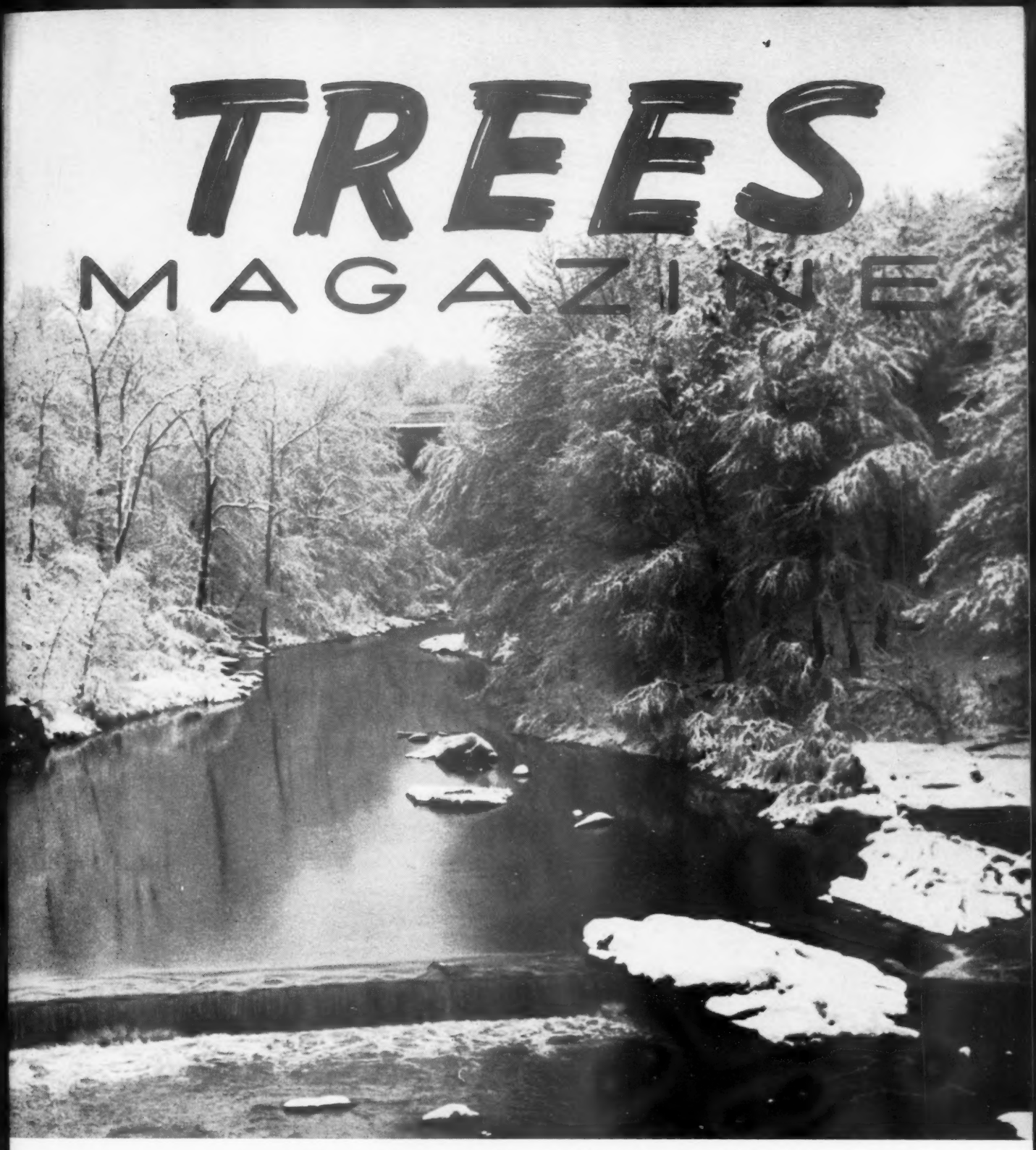
TREES MAGAZINE



Winter on the Rocky River at Olmsted Falls, Ohio

Midwestern Shade Tree Conference, Hotel LaSalle, Chicago, Feb. 13 to 15, 1952

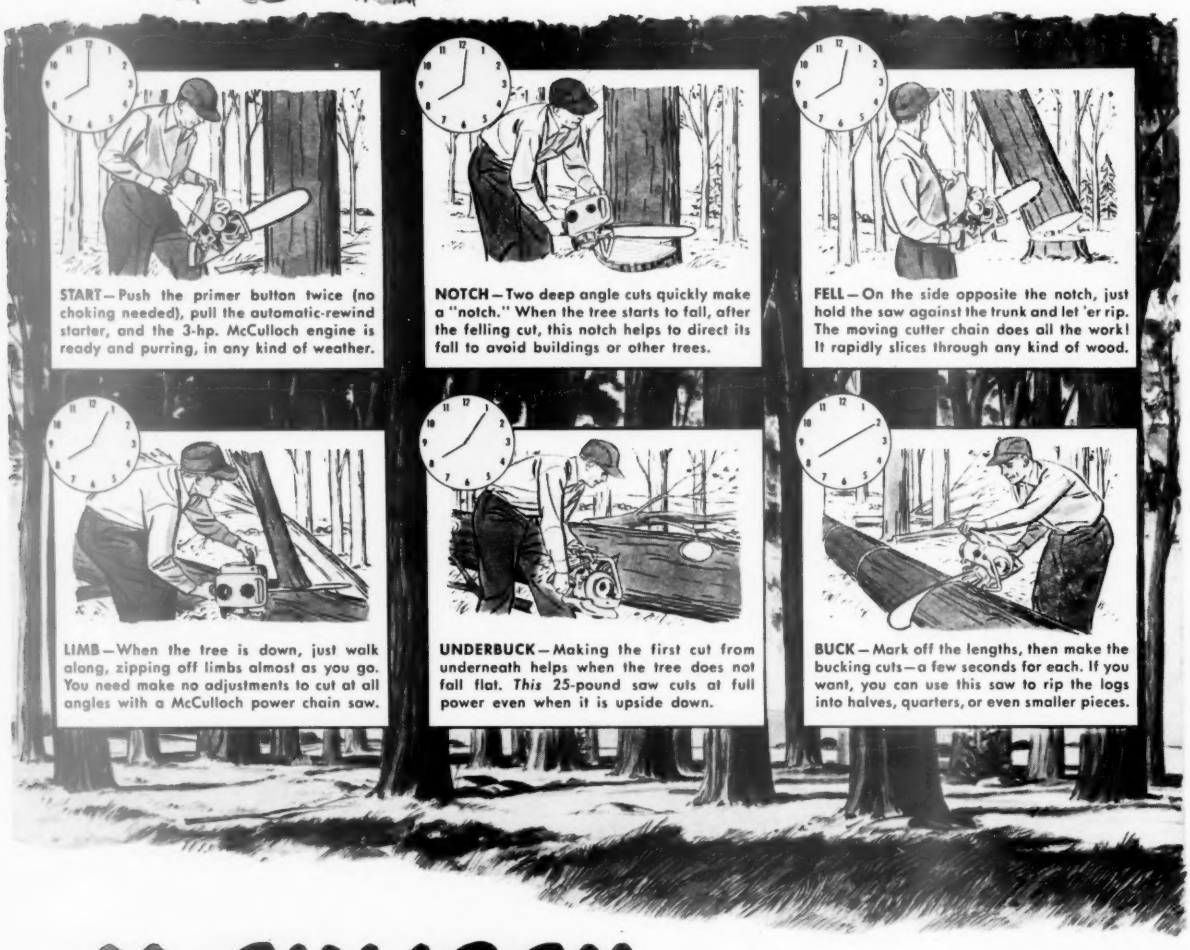
The Tree and Overhead Wire Problem — *Paul E. Tilford*

Abstracts of Oak Wilt Studies — *H. C. Young*

January-February 1952 *The Journal of American Arboriculture* Vol. 12—No. 2

Short Cut through the wood!

How about carrying your short cut through *any* wood right with you in one hand! Professional and part-time woodsmen by the thousands use these new McCulloch chain saws to save time, save labor, and make more money cutting wood. See how easy it is to use a modern McCulloch saw.



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TREES Magazine is a bi-monthly Journal published at Cleveland, Ohio, by Edward H. Scanlon, and is devoted to the furtherance of the technical and business administration of Trees (Street and Ornamental); Parks (Municipal and National); and Forests (State, National and Private), in the U. S. Scanlon Publishing Co., P. O. Box 5607, Cleveland, Ohio. Subscription by mail $2 per year; outside United States, $2.50. Advertising rates upon inquiry. Closing date for advertising copy—10th of month preceding date of issue. Unsolicited manuscripts must be accompanied by return postage.

ALONG THE WAY

With . . .
EDW. SCANLON

■ JUDGING FROM the SCHEDULE OF TOLLS proposed for the HYPOTHETICAL OHIO TURNPIKE (we'll BELIEVE IT when we SEE IT), it should be a VERY SAFE PLACE to hold the kids SOAP BOX DERBY. They'd be SAFE with a MINIMUM TOLL OF $2.90 proposed.

■ **DID YOU NOTICE the cut I used OF MYSELF in the LAST ISSUE, in the PROPAGATION STORY on Page 9 —well ITS AN OLD ONE ALRIGHT, but I USED IT so I'D LOOK YOUNGER than LOUIE CHADWICK.**

■ Got QUITE A JOLT today. Thought sure the OLD RANCHO was GOING UP IN SMOKE—some XMAS TREE BRANCHES in the FIREPLACE ignited the SOOT IN THE CHIMNEY. What a ROAR that makes—did CONSIDERABLE RUSHING around for a few minutes, but it FINALLY DIED OUT. Whew, WHAT A TIME OF THE YEAR for a fire.

■ **In SPENCE DAVIS "Gimmick" story which APPEARED IN THE OCTOBER, '51 issue there was included the WRONG NAME for a company who manufacture SOIL SAMPLING TUBES. The correct name is the OLIVER CORPORATION, 1420 MAYFLOWER ST., HARRISBURG, PA. Thanks SPENCE—and how about MORE "GIMMICKS?"**

■ CURTIS WAGNER, our AKRON NEWS SCANNER, has been TIFFING with a LOCAL COLUMNIST. Seems THIS LAD thinks TREES SHOULD BE KEPT on RESERVATIONS because they have the TEMERITY TO DROP LEAVES. You might ASK HIM CURT why doesn't he USE HIS INFLUENCE with one of the RUBBER COMPANIES to produce a LIFE-LIKE FACSIMILE that will be GREEN AND LEAFY ALL YEAR.

■ **It SEEMS TO ME that SOMEWHERE in my ACCUMULATED LITERATURE is a reference to the NUMBER OF LEAVES borne by a MEDIUM SIZED TREE. I can't FIND IT and can't REMEMBER the FIGURES. Could USE SOME HELP ON this one.**

■ This RECENT WARM SPELL brought some GOLDEN FLOWER HEADS out in the lawn — DANDELIONS. They BETTER GET BACK in quick tho, its sure BLOWING UP something WHITE RIGHT NOW.

■ **Thanks to BILL BRENNEMAN of MUSKEGON HEIGHTS, MICH., for SEED OF THE GOLDENRAIN he told us about in a RECENT LETTER. Judging from the PICTURE BILL SENT this tree hasn't had TOO MUCH CLIMATE TROUBLE at this northerly station. It also is AS FAR NORTH as we have ever heard OF A PAULOWNIA. Funny things OUR TREES.**

■ WHAT DO YOU THINK of that COVER PICTURE—kinda purty huh? The OLMSTED FALLS C. OF C. had better make me an HONORARY MEMBER for publicizing their LOVELY LITTLE VILLAGE. Took the picture AFTER A SNOW STORM in early November. The RANCHO is about a ¼ mile FROM THIS LOVELY SPOT.

■ **BILL MOTT has moved his OAKLAND PARK DEPT OFFICE, from the City Hall of the California city, to 634 FOURTEENTH ST. Good move — WE'LL DROP IN next time WE DRIVE BY. BILL — and, Oh CONGRATULATIONS on your new honor PRESIDENT, AMERICAN INSTITUTE OF PARK EXECUTIVES.**

■ Have a VERY INTERESTING STORY coming UP SOON about a BEAUTIFUL ZELKOVA TREE in BARNSTABLE, MASS. DR. MALCOLM McKENZIE of the UNIV. OF MASS., and EMILE OLLIVIER, TREE WARDEN OF ORLEANS, MASS., MASS., helped run down the FACTS IN THIS STORY. This ZELKOVA was described in a MAGAZINE STORY OF 20 YEARS AGO and was RECOMMENDED VERY HIGHLY as a NEW STREET TREE. It's BEAUTIFUL FORM (see TREES, Vol. 11, No. 5—pg. 10), and KNOWN RESISTANCE TO DUTCH ELM DISEASE, and FAIRLY RAPID GROWTH RATE should make it the No. 1 SUBSTITUTE for the American elm. IT'S VERY CLEAN TOO. Planted about 300 ON CLEVELAND STREETS this year.

■ **The officers of the newly-formed MICHIGAN LANDSCAPE CONFERENCE, Dec. 7, '51, are: Pres., HOWARD HICKS, Lansing; Vice Pres., JOHN STARK, Midland, and OH BOY, Sec'y-Treas., MRS. JANE SMITH, Lansing— Board of Directors: JOHN J. B. LIGHT, Richland; THEO. R. LAETZ, Bay City; JOHN J. POLEO, Detroit; EDWIN E. SMITH, Lansing; GEORGE MERRIWEATHER, Plymouth; ERNEST DURRANT, Grand Rapids.**

■ Anyone WISHING TO BE INFORMED of the COST of the FIRST PROCEEDINGS of the PLANT PROPAGATORS GUILD, held Nov. 8 and 9 in Cleveland, should SEND THEIR NAME, address and business affiliation to the EDITOR OF TREES.

■ **KEN PAINTER of SYRACUSE was elected FIRST PRES. of the newly formed NEW YORK STATE ARBORISTS ASSOCIATION at the meeting held at CORNELL IN JANUARY.**

■ LES HEBERT, TREE WARDEN of WEYMOUTH, MASS., has sent us SEVERAL REPORTS on his stewardship. One on an AERIAL MOSQUITO CONTROL program, the other on the CORRELATION OF TOWN FACILITIES during a SEVERE STORM last November. VERY GOOD.

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Vol. 12 Bi-Monthly No. 2

Subscription Price $2.00 Per Year (Foreign $2.50) 35 Cents Per Copy
TREES MAGAZINE
Box 5607, Cleveland 1, Ohio

The Editors of TREES invite discussions, comments and all types of literary materials pertaining to trees and tree preservation from any person engaged either in the scientific advancement or commercial development of the field.

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■ **FRANK KARPICK passes on the word that JOHN MATTHYSSE of CORNELL is planning to spend a YEAR IN AFRICA on SABBATICAL LEAVE. Should be SOME GOOD STORIES on ORNAMENTAL TREES come out of that SAFARI INTO THE VELD — Oh, I GET AROUND.**

■ Well, well, IT HAS FINALLY HAPPENED — NORMIE ARMSTRONG has left his REPUBLICAN STRONGHOLD in WHITE PLAINS, N.Y., for an equally DEMOCRATIC STRONGHOLD in CHAPEL HILL, N.C., (Box 994). It's a "FOLLOW THE SUN" deal in reverse — 9 MONTHS in the South; 3 MONTHS in the NORTH. LOTSA LUCK, NORMIE.

■ **Something about THE LAST of the Chestnuts (CASTANEA DENTATA) has come from BILL MOTT in Oakland. The MONTANA SCHOOL OF FORESTRY claims there are ONLY THREE SURVIVING CHESTNUTS in the U. S. I know of ABOUT SIX BEAUTIES in a PARK at PASADENA — BILL lists TEN ON BECK STREET in OAKLAND — lets have the LOCATION OF OTHERS, there MUST BE MANY.**

■ HAL AND BUNNY BENNETT sent a card from GREECE. They've been in ITALY, SPAIN, EGYPT — nice going kids, hope to SEE YOU SOON.

Observe NATIONAL ARBOR DAY Last Friday in April

January-February, 1952 **Journal of the National Arborist Association** Vol. 12 No. 2

EDWARD H. SCANLON, Editor
Box 5607, Cleveland 1, Ohio
ADams 5-2357

"No place is complete without trees. A home without trees is charmless; a road without trees is shadeless; a park without trees is purposeless; A COUNTRY WITHOUT TREES IS HOPELESS."

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Out On A Limb

ARBOR DAY IS COMING—APRIL 25

Arbor Day will be on top of you before you know it. In fact for at least eleven states the "Last Friday in April"—the 25th—will be the legal day.

These eleven states are: Maine, Massachusetts, Connecticut, Rhode Island, New Jersey, Ohio, Indiana, Illinois, Wisconsin, South Dakota and Nevada. Very good; and everyone in each of these states who worked to have the National Arbor Day date—the "Last Friday in April" legally adopted can be proud of his efforts. Of course the general good and general objective will not be reached or benefitted until at least twelve more states have seen the wisdom of a united observance of Arbor Day. It should be beginning to form a very definite pattern—a solid mass of the principal New England states in one group, and in the other group four of the major middle west states. From these nuclei there should, and can, spread out to neighboring states sufficient enthusiasm and recognition of the potentialities that lie within such a movement to quickly enroll another dozen states.

Nurserymen, Arborists, Park Administrators, Garden Clubs, and Educators should all make a determined effort to effect the passage of "Arbor Day the Last Friday in April" legislation in their states at the next legislative session. What better means is there for teaching the young an appreciation of gardening, trees, plants and the solemn pleasure that goes with a knowledge of the things of nature. The grave problems of national conservation, civic embellishment, home beautification all need to be thoroughly understood by multitudes, not dozens, before tangible results will accrue.

It is only a knowledge of these things that will make the general public demand good parks, scientific street tree management, functional home planting and sound conservation of natural resources. We need these developments and everyone should constantly strive for their attainment. This can only be done by the weight of the demands of the many. Few of the positions in the horticultural and forestry professions are big paying ones, consequently few have the time to devote to the missionary work, and development work, that is so badly needed. But, it is time we stood still for a minute and took inventory of what we are giving back to the industry or profession from which we have chosen to make our living. Everyone can give a little time and a little effort for the betterment of his chosen field. Of course there are the selfish self centered people who wish only to reap, and unfortunately these we shall probably always be cursed with, but even so a little extra effort by the talented and respected members who heretofore have modestly stayed in the background is badly needed. They should make themselves known and heard in their communities.

The greatest good of a National Arbor Day will come from the fact that such a day observed in a great many states on the same date would attract national publicity. What better means is there than radio, television and other such media for effectively reaching people who now take trees, lawn, parks or forests for granted, or as something that "just growed."

Here is a natural springboard for the national nursery industry's "Plant America" campaign. It would be a natural spark plug, and that the campaign needs.

Univ. of Mass. Short Course

An interesting program has been lined up by Professor Gordon King for the annual short course held in conjunction with the University of Massachusetts regular course in Arboriculture. It will be a five-day session and many well known authorities will lecture on a number of subjects. The meetings will commence Monday, March 24th in Bowditch Hall.

Program

TREE WARDENS, ARBORISTS, AND UTILITY CONFERENCE

Bowditch Hall,
University of Massachusetts,
Amherst, Mass.
March 24 - 28, 1952

Monday 24th

9:00 a. m.—Registration

1:00 p. m.—Welcome—R. Verbeck, Director, Short Courses, University of Mass.

Tree Laws and Question Period

Plant and Disease Identification Contest continued to Tuesday 5:00 p. m.—Big Prizes

Tuesday 25th

9:00 a. m.—"New Street Trees"—Donald Wyman, Horticulturist, Arnold Arboretum, Boston.

10:00 a. m.—"Rope Making and Safety"—Plymouth Cordage Company, Plymouth, Mass.

11:00 a. m.—"Safety in Handling Saws"—Oscar P. Stone, West Brattleboro, Vermont.

1:00 p. m.—"How a Tree Grows"—Theodore Kozlowski, Head, Department of Botany, University of Mass.

2:00 p. m.—"Diagnosing Tree Diseases"; "Phloem Necrosis and Oak Wilt"—Curtis May, Principal Pathologist, Division of Forestry, U.S.D.A.

3:00 p. m.—Plant Clinic—Bring your problems. Chairman, W. D. Whitcomb, Prof. of Entomology, Waltham Field Station, Waltham, Mass.

Banquet

7:00 p. m.—Guest speaker—James V. McManmon, Landscape Engineer, Dept. Public Works, Boston, Mass.

Wednesday 26th

9:00 a. m.—Welcome—Dean Sieling, School of Agriculture and Horticulture.

"Utilities and Their Tree Problems"—Chairman, Professor M. A. McKenzie, Director, Shade Tree Laboratory. Speakers will be representatives of utility companies.

Thursday 27th

9:00 a. m.—"Mist Spraying"—Albert W. Dodge, Dodge Associates, Wenham, Mass.

10:00 a. m.—"Hydraulic Spraying"—Lee Swope, Brewer Tree Company, Worcester, Mass.

11:00 a. m.—"Mist Spraying"—George Tirrell, A. B. Farquhar Company, York, Pennsylvania.

1:00 p. m.—"Gypsy Moth Control"—J. Corliss, Director Bureau of Entomology and Plant Quarantine, Greenfield, Mass.

2:00 p. m.—"Shade Tree Problems at the Waltham Shade Tree Laboratory"—P. Rusden, Instructor, Shade Tree Laboratory, Waltham, Mass.

3:00 p. m.—"Weed Control"—Film—Dow Chemical Corporation, Midland, Michigan.

7:00 p. m.—"Mist and Hydraulic Spraying"—Talks and Demonstration. Chairman, George Tirrell, A. B. Farquhar Corporation.

T. Trott—John Bean Corp., Lansing, Michigan

J. Robinson—Hardie Sprayer Corp., Hudson, Michigan.

H. Bagnell—Lawrence Aero-Mist Corp., Greenfield, Mass.

Friday 28th

9:00 a. m.—"Progress Report on Dutch Elm Disease," Massachusetts Dept. of Conservation.

10:00 a. m.—"Pruning to Control Dutch Elm Disease," D. Marsden, Assistant Prof. Shade Tree Lab., Univ. of Mass.

10:20 a. m.—"Garden Clubs Supporting Tree Warden's Program"—Mrs. T. O. Guptill, Sudbury, Mass.

10:45 a. m.—"Legislation"—A member of the House of Representatives, Boston, Mass.

1:00 p. m.—"Shade Tree Insect Problems"—William Becker, Assistant Professor Entomology Department, University of Massachusetts.

Committee:

J. E. O'Doherty, Div. Supt., Dept. of Conservation, Boston, Mass.

M. A. McKenzie, Director Shade Tree Lab., Univ. of Mass., Amherst, Mass.

L. Fletcher Prouty, Assist. Sup't. of Parks and City Forester, Springfield, Mass.

W. D. Whitcomb, Prof. of Entomology, Waltham Field Station, Waltham, Mass.

G. King, Chairman, Assist. Prof. of Arboriculture, Univ. of Mass.

Notice:

Meals may be obtained from the Draper Cafeteria on the campus. Rooming facilities are to be handled by the Housing Director, University of Massachusetts, Amherst, Mass., by written request. Please mention the conference when you write.

What—Where—When

Massachusetts Tree Wardens' and Foresters' Association, Horticultural Hall, Hotel Kenmore, Boston, Mass. February 6-7.

Michigan Forestry and Park Association, Michigan State College, Union Building, East Lansing, Mich. February 8.

Ohio Parks Association, New Ohio Union, O.S.U. Campus, Columbus, Ohio. February 12-13.

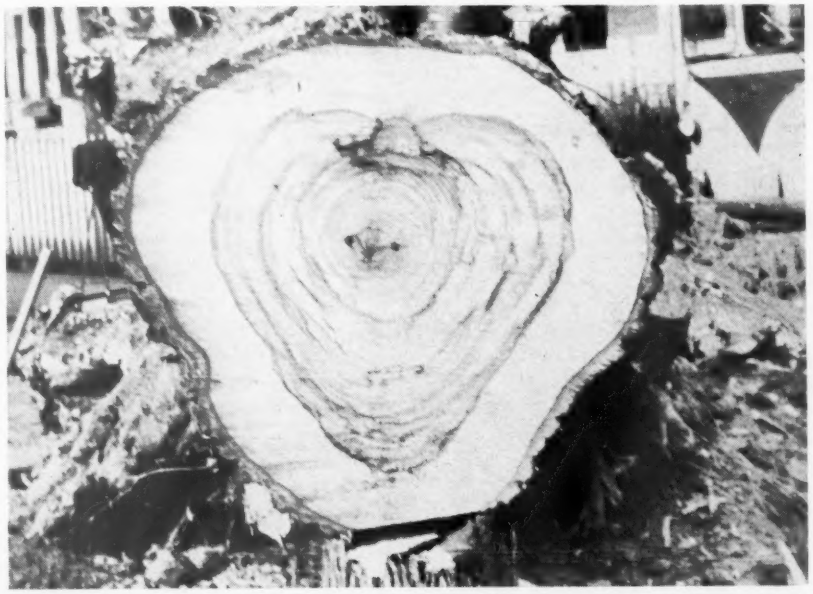
Midwest Chapter, N.S.T.C., Hotel LaSalle, Chicago, Illinois, February 13-15.

Vermont Nurserymen and Tree Experts Short Course, Agricultural Science Bldg., University of Vermont, Burlington, Vt. March 12.

Tree Wardens, Arborists, and Utility Conference, Bowditch Hall, University of Massachusetts, Amherst, Mass. March 24-28.

Southern Chapter, N.S.T.C., John Marshall Hotel, Richmond, Virginia. March 28-29.

Eleventh Annual Short Course on Roadside Development, Department of State Building, Columbus, Ohio. April 2-5.



Happy Valentine Day greetings from Harry Turner, City Forester of East Orange, N. J. This odd figuration was found in a large tree removed in East Orange on St. Valentine's Day 1951. A real Odd-i-tree.

Abstracts of Reports on Oak Wilt Studies by Various Agencies

Prepared by:
DR. H. C. YOUNG,
Associate Chairman,
Department of Botany and Plant Pathology,
Ohio Agricultural Experiment Station, Wooster, Ohio

This is not an exhaustive list of abstracts but includes most of those that have been presented or published.

1. Oak wilt carried by the leaves: Experimental work was initiated and in which leaves were inoculated, then stored in various ways. Fungus found in the large veins of the leaves.—Henry and Riker of Wisconsin.

2. Infection must take place through wounds extending into the outer xylem tissue; this would require severe wounding. Attempts are being made to induce infection courts by the use of carborundum or sandpaper. Since this type of wounding must extend to the xylem, it is doubtful if soil inhabiting insects, scale, or spittle bugs on twigs, or spider or leafhopper on leaves can cause sufficient wounds for infection. (Henry, Riker of Wisconsin and Young, Iowa).

3. The fungus has been isolated from all parts of diseased trees except the acorn. (Young, Iowa).

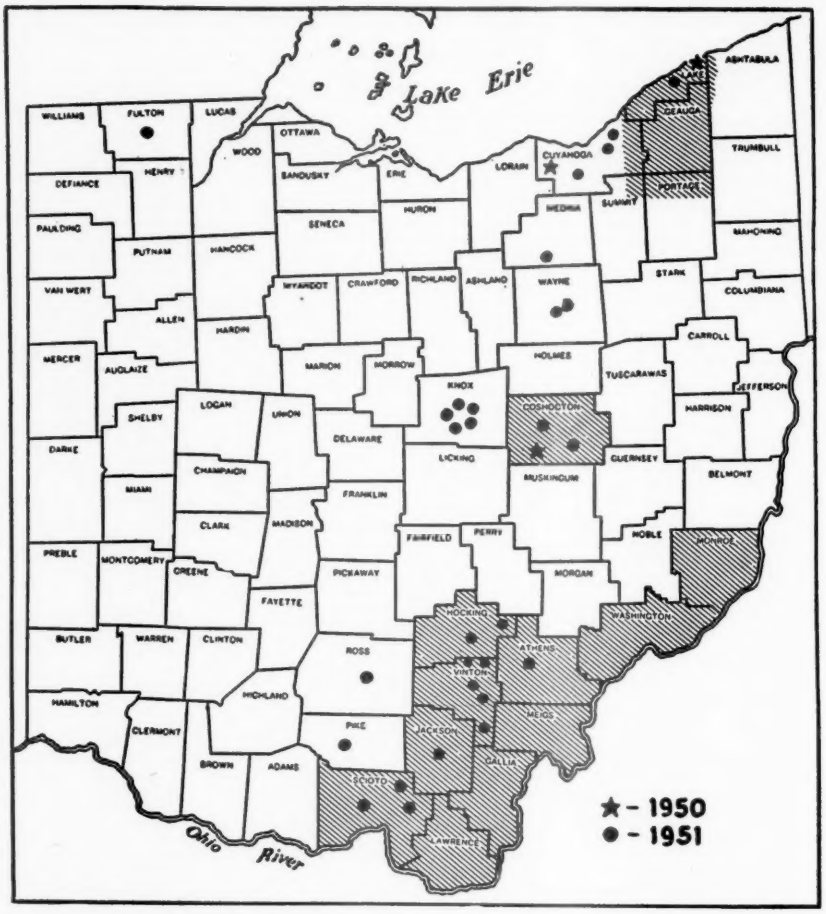
4. Birds are suspects in carrying or spreading the fungus. Preliminary investigations have not confirmed this suspicion on woodpeckers. A limited amount of caging was tried.

5. Iowa in 1950 had Mr. Parker, Schuldt, Young, and others working on oak wilt. Young found that the organism produced a toxin that spread throughout the vascular system, causing wilt. Pathologists in Wisconsin think plugging causes wilt.

6. Pruning experiments in Iowa showed that the disease could be stopped in white oak group but not in red oak. It went too fast in the latter. Kuntz of Wisconsin has pruned white oak and disease has not reappeared now for three years. Needs more work before statement should be made.

7. Chemotherapy practiced in Iowa: A great many organic chemicals were screened in laboratory and greenhouse and tested on infected trees. They report some degree of success.

8. Hoffman of Iowa reports, could not recover the organism in any wood six months after cut or death. The organism does not occur in the heartwood. Only in the sapwood. Later work shows that the fungus has lived over a year in logs under certain conditions.



Shaded area—Covered in Aerial Survey

Black dots—Trees infected with Oak Wilt

9. Henry of Wisconsin inoculated a red oak tree in the trunk. The first symptom that showed was at the top in one small branch. He then felled the tree and found the fungus all over the crown, even in branches that looked entirely healthy.

10. Dr. May explains the more rapid spread in the red-black oaks, because of long vessels, whereas white oak has short vessels. Also, the white oak vessels fill up quicker.

11. Riker points out that bur oaks remain alive in the midst of a clump of diseased and dead black and red oak. If it is insects or birds carrying, why would these bur oaks not get the disease.

12. Dr. Riker and Kuntz proved that root grafting was one method of immediate spread from adjacent diseased to healthy trees. The extent of natural root grafting is amazing. These grafts are in the top 30 inches of soil.

13. Hoffman of Iowa describes method of feeding in the poison. Treatment must be prompt; soon after wilting starts the tree will not take it up, or after it dies or for a period before death.

14. Translocation of poisons, dyes, and radio-iodine and its relation to oak wilt: Beckman and Kuntz of Wisconsin —A single tree in a jack oak plot was treated with arensite, five trees were killed. When these were treated, 21 additional trees died, when these in turn

were treated another 10 died. Radioactive iodine moved within six hours to three trees respectively, two, five and 12 feet from the nearest treated tree. Upward movement of radioactive iodine was as rapid as 12 feet in five minutes in jack and bur oak.

15. Kuntz and Riker: Immediate removal of each wilting tree has retarded the disease in 11 out of 18 eradication plots. In four of these, no new cases have appeared in two years. Where single wilting trees have been poisoned, no spread has occurred in six one-year old plots or in three two-year old plots. Poisoning healthy trees adjoining diseased trees has prevented further local spread in 12 plots of which six were four years old. Trenching around diseased centers stopped the spread.

16. Bretz found that Chinese chestnut, *Castanea mollissima,* was susceptible to *Chalara quercina.* Disease has spread fast in one planting in Missouri.

17. Bretz, July, 1951, reported the perithecial state of *Chalara quercina* in culture. The media used was finely ground chestnut meats or the water soluble extracts from chestnuts in agar. A culture obtained from red oak, *Quercus borealis,* was grown in culture plate with a culture obtained from *Castanea mollissima.* The perithecia occurred in a zone where the two cultures came together. Neither isolate when grown alone has produced perithecia. A few fertile perithecia have been found in pairing the isolates on sterile twigs of Chinese chestnut, American elm, and a prunus species, and on potato dextrose agar. The germination of a scospores in 2% dextrose solution at 25°C is rapid and at the end of 20 hours the single germ tube produced gave rise to characteristic *Chalara quercina* endoconidia. Has produced disease by inoculation with ascospores and with cultures grown from ascospores.

18. Bretz reports the extension of the host range additional species of Quercus (European), one more species of Castanea and species of Lithocarpus and Castanopsis have been found to be susceptible.

19. A re-survey of Ohio shows all of the confirmed trees of the red, black, pin, and scarlet oaks now completely dead. Several new centers have been located.

20. Beckman, Kuntz, Riker, and Berbee of Wisconsin report on the rates of movement of liquids in xylem vessels of healthy and diseased pin oaks by the use of radioactive rubidium. Rubidium moved upward approximately a foot a minute in healthy trees and in inoculated trees prior to symptom development. As severe wilt occurred the movement was almost entirely stopped. A similar reduction occurred with water in diseased small twigs. Either no bud growth appeared or buds shriveled three weeks after defoliation in inoculated trees. No important plugging of roots has been noted.

These results indicate that vessel plugging is a direct response of the host to infection, that such obstruction may limit the available water supply, that this shortage may contribute to leaf symptoms.

21. Factors influencing the development of oak wilt symptoms were studied by Kuntz, Beckman, and Riker. Root-inoculated northern pin oaks (65,000,-000 spores per tree) developed widespread incipient wilt in three weeks, regardless of the date of inoculation (May 23 through Sept. 6). *Chalara quercina* H. was often isolated from the entire tree a week before and consistently at the time of initial symptoms. Moreover, the reductions of upward movement of radioactive rubidium (86/Rb2CO3) and of water flow through twig sections were confirmed. In five weeks, severe wilt developed. Oaks inoculated in a low, lateral branch likewise developed incipient wilt in three weeks. However, initial symptoms and often *Chalara* were restricted to inoculated branches. Neither rubidium nor water moved through these wilting branches although such movement was normal elsewhere. With these lateral-branch inoculations, wilt symptoms progressed unilaterally upward into the terminal. The entire crown wilted only after seven weeks. Terminally-inoculated oaks also showed incipient wilt in three weeks but severe wilt was delayed until seven weeks. Incubation periods increased as spore loads decreased. At low spore concentrations (6500 to 65 spores per tree), branch-inoculated trees showed symptoms sooner than root-inoculated trees. Differential responses to places of inoculation and spore loads have implications for long-distance spread.

22. L. R. Tehon reports from Illinois: "The first definite project is an annual and very careful survey of the Sinnissippi forest along the Rock River near the town of Oregon. Here we have some 1700 acres of very valuable forest in which oak wilt made its first appearance about 1946. Our University of Illinois Dept. of Forestry had the supervision and management of this forest as a technical project and has mapped it as to stands, compositions of stands, soil types and many other silvicultural factors in a degree of detail that I think is probably not true of any other forestry tract in this part of the United States. By using the cruising methods of forestry, we know the location of every diseased oak tree in the tract and, by repeated cruisings annually, we hope to be able to learn a great many things about the destructiveness, spread, and the possibilities of control under commercial conditions. This past summer, i. e., 1951, was our second year of detailed work in the area. Among the many items that have come from that survey is the very impressive one that, so far as the season of 1951 alone is concerned, there are now standing in that forest oak trees dead during the season of 1951 that, if logged off, will furnish more than 100,000 board feet of lumber.

"The second definite project is being carried forward for us by the Forest Preserve District of Cook County at the expense of that District. Here we are trying to limit the ravages of the disease by severing root grafts and isolating diseased trees from those healthy trees standing nearby. The Forest Preserve has used a heliocopter to spot with exceeding thoroughness every possible case of infection. It has purchased at a cost of something like $10,000 a ditch-digging machine that will cut a very narrow trench and return the earth to the trench as the machine moves on. This, of course, is at attempt to adapt Dr. Riker's method to our soil.

"Up to very recently, our third project seemed very slow to produce tangible results. Now I can say that, partly as a result of certain very didactic laboratory procedures, partly of very energetic field efforts, and very largely as a result of some extraordinary bits of luck, our search for the means by which the fungus gets out of the tree has yielded what I think are tremendously significant results. We have gotten individual patches of sporulating fungus between bark and wood as big as a man's hand and our young men feel sure that they can, and probably will, find those patches, under the right conditions, 10, 15, and 20 feet in length and completely surrounding the trunks. They expect to report on this finding at the Phytopathological Society meeting.

23. The following report is an abstract of the work of F. A. Peevy of the Southern Forest Experiment Station at 1008 Federal Office Bldg., New Orleans 12, La.:

"Hundreds of thousands of acres of southern uplands are covered with black-jack oak and other low-value hardwoods that must be reduced or cleared before good timber or forage can grow," Mr. Peevy said. "Many landowners have found poisoning with 'Ammate' an effective and economic way of killing these weed trees."

Mr. Peevy said that, when properly used, "Ammate" kills trees more rapidly than girdling. He said that there are

(Continued on Page 24)

Why I Like The Bur Oak

By Noel B. Wysong
Forester, Cook County Forest Preserve, River Forest, Ill.

Quercus Macrocarpa

In considering possible nominees for the position of "My Favorite Tree," I find myself in the category of the proverbial sailor with a favorite in every port. My favorite tree in one section of the country would not be my choice in another. I also find that my selection of candidates is based largely on personal associations, often in connection with one or two individual trees, rather than on any economic attributes that the species may possess. It is almost impossible to rationalize preferences that, like Topsy, "just growed." One doesn't stop to analyze why he likes his friends, and trees, to me, have always seemed very much like friends. As with all friends, certain trees, more than others, seem worthy.

A good many years ago, when climbing a tree was still a delightful adventure, three big cottonwoods shaded a little pool in a spring-fed creek that meandered across my dad's Kansas farm. They towered high above neighboring willows and elms, and fairly dwarfed the trees in our apple orchard. To me, they were the biggest and most important trees in the universe. That cottonwoods were, and still are, important in the Kansas plains country is a matter of record. Being about the only trees that would grow, even along the shallow streams, in the heat and drought and wind of the open prairies, they furnished the early settlers with shade, fire-wood and fence posts, —and on occasion, it is said, they served as impromptu gallows for the hapless miscreant who overestimated the speed of his horse! Today, though many other species have been introduced successfully, cottonwoods are still the Big Trees of Kansas and provide the only shade around many a farm home. My Favorite, then, in Kansas—the cottonwood.

Writers many times have poetically described various down trees as, "a

(Continued on Page 16)

A grizzled old Bur Oak standing in a forest area somewhere in Illinois. Its wide spread makes it a sturdy part of any landscape.

National Arbor Day — "The Last Friday In April"

The Tree and Overhead Wire Problem

PAUL E. TILFORD,
Executive Secretary
National Arborist Association
Wooster, Ohio

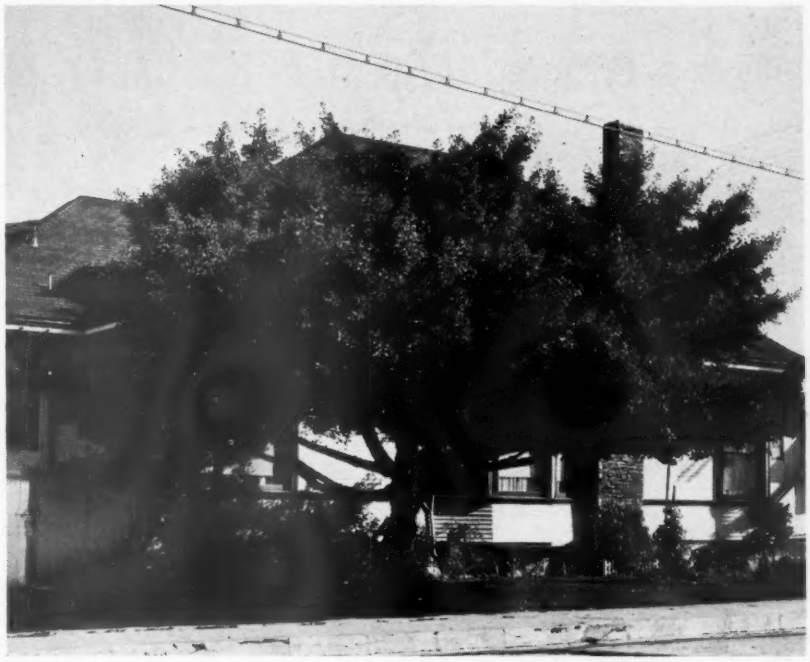
This paper was given before the Edison Electrical Institute at Rochester, N. Y., Oct., 1951

Man has been associated with trees for a long time. He likes trees. They furnish him with many useful products, add to his comfort and pleasure, and are important in conserving both soil and water from which he obtains his subsistence. Man has planted trees around his home, on streets, highways, in parks and playgrounds for his enjoyment and welfare. No city or town where trees will grow is without them.

With the advent of the overhead wire for the transmission of the human voice and electric power, a tree-wire problem originated. Houses and business establishments were located along streets and highways which were lined with trees. To bring the telephone and electricity to these houses and businesses, pole lines were constructed and usually the best place for these lines was along the streets and highways. Since tree branches in contact with either communication or power lines cause faulty service, an overhead-line-tree problem has developed which is of considerable proportions.

The demand for and use of utilities using overhead lines has grown tremendously. It is said that 90 per cent of the nation's farms have electric power available. There are more than 35,000,000 telephones in service. Our jobs, health, pleasures and comforts are dependent to a high degree on the continuous functioning of utilities. We need and expect continuous, almost uninterrupted service. One of the major causes of failure of telephone and electric service is trees. The purpose of this discussion is to examine the Tree-Line problem as it exists today and to attempt to look ahead to see what the problem may be like in the future.

Utility companies have done a great deal to alleviate the tree problem by placing millions of miles of cable underground and by constructing their overhead lines to lessen the conflict with important trees. While these practices are commendable, should be continued and in many instances expanded, their limitations are well known. At this time there is no alternative, if satisfactory, uninterrupted service is maintained, except to trim millions of trees at regular intervals to clear lines. This work is so essential and of such a volume that a line clearance industry has developed. Many arborist or tree expert companies who are members of the National Arborist Association with which I am associated, contract with utility companies to do line clearance. The Wall Street Journal in March, 1948, referred to a $50 million line clearance industry.



A newly discovered Shade Tree Selection. This umbrella-shaped Ginkgo found in a California city recently should make a marvelous tree for use under overhead wires in cities. The known tolerance of the Ginkgo for atmospheric pollution and its comparative freedom from disease or insect attack makes it doubly desirable. Note low cable over tree crown.

Even though the tree problem for the utility company is large, it is being fairly well met as evidenced by the fact that telephone and electric service is generally good. Also, considering the millions of trees, and the number of tree species with different growth rates, shapes, wood strengths, and their location with respect to overhead lines, the trees, generally, in recent years have received fair treatment. It is true that many trees have been butchered to make way for lines. In some instances this was unnecessary, but in many cases there just wasn't any other thing to do, if the tree was to remain and the line was to go through. Let us consider for a moment the possible future picture and then look for ways of improving it.

Since World War II there has been tremendous expansion in housing. Almost every town and city has new subdivisions. The need for more houses still exists although the rate at which new units are being constructed is temporarily checked. These new houses for the most part are on the fringe of the older sections of cities. People want to get out of congested areas. A decentralization of housing as well as decentralization of industry is under way. The automobile and the availability of utilities to suburban dwellers have had much to do with this outward movement. When new suburbs and homesites are developed, trees are planted almost immediately, if none are there.

In many instances, varieties of trees are planted which will grow big and tall regardless of the space available for street, sidewalks, utilities and trees. Very frequently two or three trees are planted where there is only room for one and they may be set directly under overhead lines. Trees never remain static; they grow. And after 10 to 20 years and more, the tree problem in many subdivisions of recent origin will be the same as now exists in old residential sections. There is little evidence that we are profiting much by our mistakes of the past.

This repetition of old mistakes is not confined to new residential areas. Almost in every community each spring cases can be observed where property owners, and sometimes city officials, have planted small trees, which if left unchecked will grow to heights of 60 feet and more, directly under utility

(Continued on Page 20)

Tree Troubles as Affected by Heredity and Environment

This paper was given at the Conference of the New Jersey Federation of Shade Tree Commissions, Dec., 1951

SPENCER H. DAVIS
Associate Professor, Plant Pathology, Rutgers University

This paper is not a statement of new facts but merely a portrayal of how these facts work so that we may better understand some of our tree problems. Perhaps this should be presented to a nurserymen's meeting since they are the ones who do the propagation of most of the materials which we use. However, I repeat that this is given primarily with a view to answering some of the questions which arise in the minds of us as tree men.

In 1865 after eight years of investigation Mendel read results of his work before the Natural History Society of Brunn. This was the first time that the story of heredity was presented to an audience. Following Mendel's paper many others have been written which describe the inheritance of flower color, tall and dwarf peas, red kernels in corn, eye colors in the fruit fly, etc.

These factors for color, height, etc., and incidentally to this paper, for disease, are dependent upon the chromosomes and genes in the cells of the plant. In every cell of the plant the identical combinations of chromosomes are found as are present in every other cell of that particular plant, all of which goes to make up the general appearance of the plant. However, during sexual propagation the gametes (as represented by the pollen and ovary in plants) have a reduction of the number of chromosomes to one-half the number found in each parent. Thus if the parent tree has two chromosomes (let us assume that one has the factor for *Good* and one the factor for *Bad*) then each gamete would have only one chromosome and could carry only *Good* or only *Bad* with it.

When these gametes are joined together in the ovary we will again find the double number of chromosomes will be present in each cell of the seed and future plant which grows. All of this division of number of chromosomes and subsequent union of the gametes is purely a case of chance. If we were to assume that in two trees growing in a field one tree had two chromosomes with *Good* and one tree had two chromosomes with *Bad* we would find this result. Of 100 pollen grains coming from the *Good* tree, each one would have one chromosome for *Good*. And on the *Bad* tree of 100 flowers each would have one chromosome for *Bad*. The result would be 100 seeds and ultimately trees each of which had one *Good* and one *Bad* chromosome.

If we look at a couple of these trees twenty years later when they in turn are producing pollen and flowers we would see this story taking place. Out of 100 gametes (pollen grains) produced by the one tree, 50 would carry only the *Good* factor and 50 only the *Bad* factor. Likewise in the other tree we would find that out of 100 flowers produced the ovaries of 50 would carry only the *Good* factor and 50 only the *Bad* factor. When the pollen was blown from one tree to the other the laws of chance would result in 25 of the *Good* pollen grains landing on the *Good* ovaries and 25 on the *Bad* ovaries (resulting in 25 seeds with chromosomes *Good Good* and 25 seeds with *Good Bad* chromosomes). And of the 50 pollen grains carrying only *Bad* chromosomes, 25 would pollinate ovaries with *Good* chromosomes and 25 with *Bad* (resulting in 25 seeds with *Good Bad* and 25 with Bad Bad). Thus the final results in 100 seeds are: 25 *Good Good;* 50 *Good Bad;* 25 *Bad Bad.*

In addition to this mathematical accounting of the chromosomes the story of dominance enters the picture. With some factors we would find that a *Good* gamete joining a *Bad* gamete would form off-spring which did not appear to be either good or bad, but appeared to be merely mediocre. On the other hand with some factors we find that the one gene is dominant over the other. Thus an off-spring which may have *Good* and *Bad* in it may have the *Good* factor dominant so that the off-spring appears perfectly normal. However, remembering the fact that in this off-spring one-half of the genes are *Bad* we can see that when it forms gametes one-half of the number will be completely *Bad*.

But all of these general factors are old history to the geneticist as far as basic concepts and even actual confirmation dealing with a few factors of only a few plants. New work is constantly being done as exemplified by some of the following quotations. This one, dealing with one of our worst human diseases, is probably the most thoroughly studied disease of all but even in this all the answers are not known as yet. "Another piece in the jigsaw puzzle of cancer fell into place today at the Jackson Memorial Laboratory, headquarters for study of heredity and cancer. This new piece seems to show one reason why some persons are less likely to get cancer than others—The reason was traced to a single gene—grafted cancers lived only in mice which had this particular gene. They would not live if this gene was absent. More amazing, it was discovered that this gene had five forms. For the grafted cancer to live the mouse receiving it had to have exactly the right one of the five forms. This means that every cell was able to protect itself against the grafted cancer unless it had the one susceptible gene."

At the next meeting of the American Phytopathological Society to be held in Cincinnati next week a number of papers are being presented dealing with diseases in plants in relation to heredity. A few of these titles to show the type of work which is being done are:

1. "Inheritance of Cedar Rust Resistance in Apple."
2. "The Use of Tetraploides in Breeding Scab Resistant Apples."
3. "Studies on the Inheritance of Resistance to Downy Mildew in Onions."
4. "Symptomless Carriers of Fusarium (a fungus) in the Carnation."

Other typical reports made in recent years and dealing with shade and ornamental trees are as follows:

1. "Experimental Propagation of Disease Resistant Elm Selections by Vegetative Cuttings."
2. "Selecting White Pine for Resistance to Blister Rust."
3. "Leaf Rust Resistance Within Certain Species and Hybrids of Poplar."

Thus we find that much work has been and is being done on the genetical approach to prevention of disease in plants.

In this paper today, I would like to give a diagrammatic picture with the

(Continued on Page 12)

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Tree Troubles

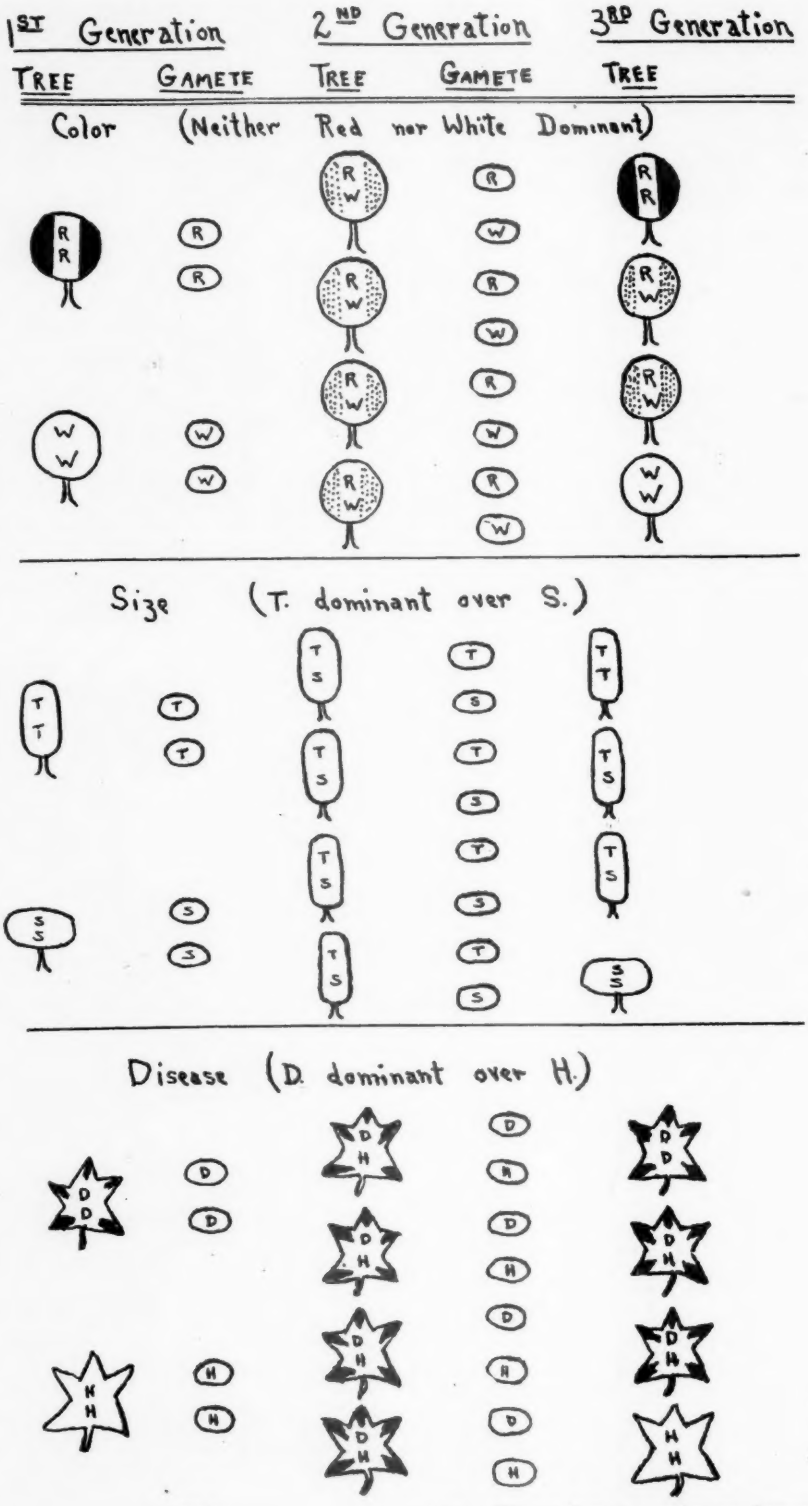
(Continued from Page 10)

use of slides on how some of these reactions occur and examples of results in nature. With this I attempt to get across the fact that in some localities we may find one or two specimens of a given species of tree to be completely healthy while all of the neighboring trees are seriously affected with disease. Or, in other cases the reverse may be true, all based upon the story of heredity.

Along with the heredity story we may sometimes find trees and plants of identical genetical background (plants which have been propagated by vegetative cuttings from a single specimen) showing varying response to a given disease. The answer to this phase of the story may be found in the effect of variation in environment or local conditions upon the organisms causing disease. Examples of this phase are found in the following papers presented at recent Phytopathological meetings.

1. "Effect of Temperature on Pathogenicity and Growth of Sclerotium Sclerotiorium (a fungus)."
2. "Effect of Temperature on the Development of Some Diseases of Ornamental Plants."
3. "Influence of Climate on Incidence of Fusarium Rot and Dry Rot in Gladiolus."
4. "A Study of the Relationship of Potash Treatments to the Development of Cotton Wilt Under Varying Conditions of Soil and Environment."
5. "Effect of Nutrition on Tomato Verticillium Wilt."
6. "Nutrition of the Trees and Development of Dutch Elm Disease."

In addition to these factors of effect of environment on fungus and bacterial disease we are all aware of the fact that many of our tree troubles are not of pathological nature but are purely physiological troubles. The soils and farm crops departments are probably most aware of these disturbances as seen by many of their reports dealing with the effect of chemical properties (pH and fertilizers) and physical properties (soil colloids, moisture holding capacity and contour farming) of the soil on growth, yield and general health of our plants. In our tree work we often find this exemplified by the fact that two individuals of the same genetical make-up may still have different reactions to a hot day in that the one growing on a good deep, well drained soil will remain in excellent condition whereas its neighbor a short distance away and growing either in poorly drained soil or in very shallow soil may have severe leaf scorch. Let us look at this entire story in picture



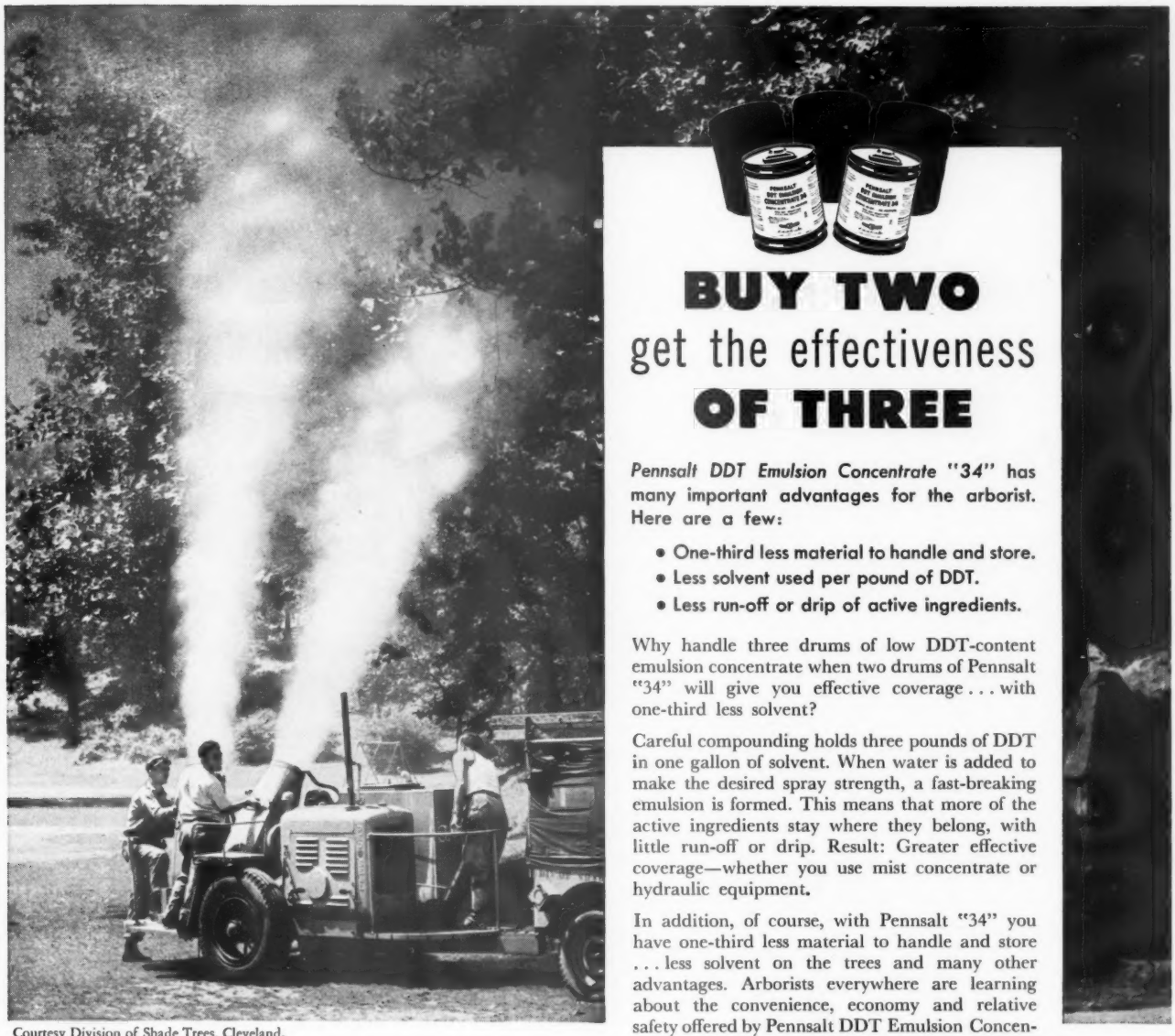
Slides

First, let us look at the story of form for a better understanding. genetics and some of the examples of how heredity works.

(1) In this picture we see two individuals portrayed with each carrying two chromosomes. We see that one carries two factors for *Red* and is a red individual, while the other carries two factors for *White* and is a white individual.

(2) In the off-spring from this generation (or let us call it second generation) we see that when the *Red* and *White* chromosomes are joined together each one of the off-spring

(Continued on Page 26)



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Trees...

NAA NEWS

By PAUL E. TILFORD, *Secretary*
Box 426, Wooster, Ohio

Rockefeller Center Trees

Eight American elms were planted at Rockefeller Center, Fifth Avenue, New York City, in 1939. The trees died and were replaced with eight English elms in 1948. These trees have never been vigorous following transplanting and three died in 1950. Growing conditions at the Center, in the heart of the nation's largest city, are hardly comparable to forest conditions where trees really like to grow.

Officials at the Center, not to be discouraged, set about finding suitable replacements which might be able to survive. Four species were considered—the ginkgo, the pin oak, the Oriental plane, and the honey locust. The Oriental plane was ruled out as being too dirty. The ginkgo and pin oak were ruled out because due to their shape they would not fit in aesthetically with the five remaining elms. Honey locust was finally selected.

One of the Honey Locusts moved to Rockefeller Center by Heflin & Storms. The trees were root pruned prior to moving and in three months had made from three to five feet of growth.

Heflin & Storms, Arborists, Wyckoff, New Jersey, were given the transplanting job. Sixteen-inch diameter honey locusts growing at Clover Hill, New Jersey, in fairly heavy red clay were root pruned June 30 last year. All roots were cut off at the edge of eleven foot balls. The trenches were backfilled with a mixture of one and one-half bales of peat moss, one and one-half pounds of super phosphate, three pounds of limestone, and red clay per tree.

An examination six weeks later showed twelve inches of new root growth and at the time of transplanting, which began on September 30, just three months after root pruning, Slim Heflin said: "We found a mass of fiber root development, as thick as hair on a dog's back and from three to five feet in length." The photograph gives some idea of the amount of new fibrous root growth which developed in the three-month period. In preparing the tree for transplanting the new roots were combed out and were kept moist with wet burlap during moving.

If the three honey locusts do well at the Center, probably the five remaining elms will be replaced finally with locusts. Rockefeller Center has gone to considerable trouble and a great deal of expense to supply a bit of Nature's beauty to the most modern of man-made environments. We admire their choice of the honey locust and hope they have found a tree which will thrive on Fifth Avenue.

And we congratulate Slim Heflin. He has been successful in getting trees to grow in some difficult places. We hope his locusts grow.

Seventh Midwest Tree Conference

The usual strong turnout is expected for the popular Midwestern Shade Tree Conference to be held Feb. 13-14-15 in the LaSalle Hotel, Chicago.

President Al Carlstrom will give the Address of Welcome at 11:00 a. m., Wednesday, Feb. 13, to be followed by Professor Roy D. Shenefelt of the University of Wisconsin whose subject is "Insects as Carriers of Tree Diseases." A number of other fine speakers with timely subjects round out a good program. You are warned to make reservations early.

PROGRAM

Wednesday, February 13

A. M.
9:00-11:00—Registration
11:00-11:15—Welcome
Alfred F. Carlstrom, President
Midwestern Chapter, National Shade Tree Conference
11:15-12:00—"Insects as Carriers of Tree Diseases"
Roy D. Shenefelt, Associate Professor
University of Wisconsin, Madison, Wisconsin
Lunch
P. M.—Rhodell Owens, Session Chairman
1:15-2:00—"Safety Practices in Arboriculture"
Karl Kuemmerling Forester to Public Utilities, Canton, Ohio
2:00-2:45—"The Arborist in Community Development"
Robert E. Everly, Superintendent
Glencoe Park District, Glencoe, Illinois
2:45-3:30—"Labor Management Relationships"
Harold W. Glissmann, Superintendent of Grounds
Father Flanagan's Boys' Home, Boys town, Nebraska
3:30-4:30—"Tree Pests"—Symposium
7:00-8:00—Meeting of Executive Committee
Midwestern Chapter, N.S.T.C.

* * * *

Thursday, February 14

A. M.—Lloyd Beal, Session Chairman
9:30-10:15—"Co-Operation vs. Cut-Throat Operation"
Marvin Stevens, Arborist
Glenview, Illinois
10:15-11:00—"High Speed Ecology and the Arborist"
August P. Beilmann, Manager
The Arboretum, Missouri Botanical Garden, Gray Summit, Missouri
11:00-12:00—"Stump the Plant Experts"—Panel Discussion
Lunch
P. M.—John Swingle, Session Chairman
1:15-2:00—"Economic Trends Affecting Arborists"
Oscar Borgmeier, Treasurer
George A. Davis, Inc., Chicago, Illinois

(Continued on Page 21)

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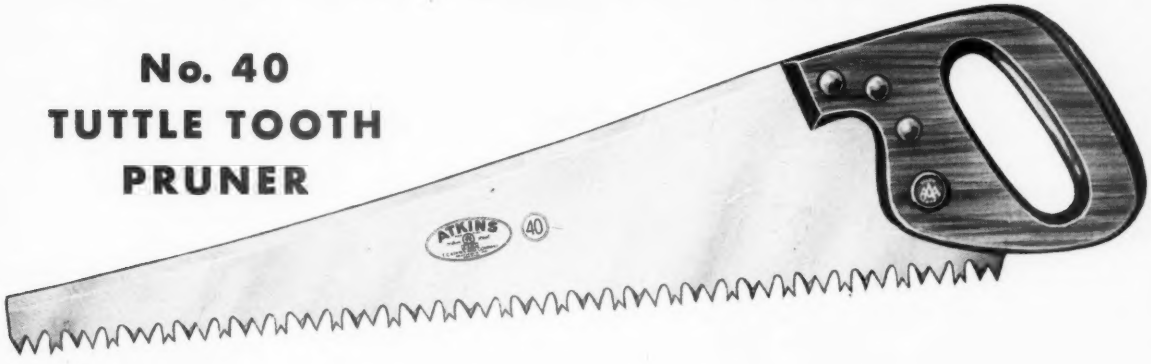

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Bur Oak

(Continued from Page 8)

fallen Monarch of the Forest." When I come across that phrase I can think of only one tree, —a giant Douglasfir that I saw felled twenty years ago just a few miles east of the city limits of Seattle, Washington. It was truly a monarch, standing head and shoulders above its neighbors. But it bowed to the loggers saw, and came down with a tremendous crash. The echoes bounced back and forth between the steep walls of surrounding hills until it was difficult to believe that only one tree had fallen. The clean, straight length of the trunk spanned a little gully, and the top lay completely shattered two hundred feet or more from the stump.

Several days later I visited one of the busy Seattle mills, and watched great Douglasfir logs being sawed into lumber for houses and furniture and the thousand-and-one other necessities that are fashioned from the wood of this kingly tree. Named in commemoration of the Scotch botanist, David Douglas, this tree is worthy of the title "Monarch," for it attains heights that are exceeded only, in American forests, by the sequoias of California. To anyone who ever has seen it growing in the Pacific Northwest, the Douglasfir always will be a ranking favorite.

Certainly the white pine deserves the respect and admiration of every American for the role it has played in the development of this country, and for its sheer beauty as a tree. But I doubt that I would include it in my list of favorites, except for one old-timer that reared boldly above a rugged promontory on Isle Royale. The fire that burned a vast acreage in this wilderness area in 1936 had just been brought under control, and vigilant patrol of the fire line was being maintained from Rock Harbor Camp on the eastern shore of the island. A game trail rose sharply from the water's edge and wandered back over the steep ridges and through the swamps that supported a tangled jungle of hardwoods and conifers. One day I followed this trail into a section of the island I had not yet seen, and near the summit of a ridge suddenly came upon this old pine. A veteran of several centuries, it was one of the very few big pines yet remaining on the island. Its roots partially embraced an immense boulder that protruded jaggedly from the surface of the rocky soil. A big limb, broken and hanging in the crown, presented a mute evidence of the gales and snows that had buffeted the tree in past years. A slightly deformed trunk had enabled it to escape the loggers axe. From its base one could look out over acre upon acre of green forest stretching away on either side of the ridge to the blue waters of Lake Superior far in the distance. Like a monument it harkened back to the days when King Pine reigned in the Lake States, —a grand tree in a magnificent setting; a tree to be remembered always.

The tulip poplar of Kentucky and Tennessee is one of my favorites. In its native habitat it stands proudly straight and tall, pale-barked and beautiful. Though towering over its forest companions, its clean, slender trunk, and long-petioled leaves that tremble in the slightest breeze, give it a deceitfully fragile appearance. Men who tamed the Kentucky wilderness made use of these graceful trees in building their homes. Once, in helping take down a dilapidated and long-deserted log cabin not far from famous Mammoth Cave, I came across a hand-hewn beam that stretched the full length of the cabin, — it must have been twenty-five feet or more from wall to wall, —a good twelve inches square, and as sound as a pre-war dollar. The passage of time, and the smoke which through the years had curled up from the open fireplace, had so blackened the exposed surfaces that it was impossible to tell from what kind of tree the beam had been fashioned.

(Continued on Page 18)

Trees...

Shade Tree Selection

This Shade Tree Selection is a rarity indeed. Nowhere is there listed an upright Dogwood. This rare form of Dogwood should be an invaluable item in landscaping. Its upright form, flower and fall color should make it a generally all-around useful piece of landscape material. The tree shown is 15 feet tall, four feet wide and has a four-inch caliper.

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Bur Oak

(Continued from Page 16)

But when I cut into it the typical soft tan color and velvety texture of yellow poplar was unmistakable. I later learned that it was not at all uncommon to find beams of this type in the older log cabins of the region.

Despite its soft wood, which serves many commercial industries and is a special delight to whittlers, it seems to be a strong tree. I don't recall ever having seen a forest-grown tulip poplar broken by wind or storm. The term "poplar" is, of course, misleading, for the tree is an honored member of the Magnolia family. It is one of the largest, if not indeed *the* largest, of all deciduous tree species in America. Many people would join me in declaring it the most beautiful.

There's a baker's dozen more trees which, for one reason or another, I like particularly well. But of all of these perhaps the most outstanding is the bur oak, or mossy cup oak, Quercus macrocarpa, of Illinois and Indiana. Here this tree reaches its maximum growth, often attaining heights in excess of one hundred feet. It is a valuable tree in forests managed for timber production, and is equally good as a shade tree in city parks or wherever it has room enough to develop normally.

It is a tree that, in appearance, is old from the beginning. It never has the slender grace of youth; even as a seedling its trunk, branches and twigs are stout and competent. The term "beautiful" can be applied to most trees, —not, however, to the bur oak, for that adjective is much too suggestive of the feminine to fit this sturdy tree. The bur oak personifies strength, —rugged, rawboned, masculine strength like that, for example, possessed by Abe Lincoln. Its thick, horny bark; its massive branches that never grow straight but constantly jut out at unexpected angles from knobby, powerful elbows; its short rigid twigs, —all bespeak toughness of fiber in which there is little of beauty or symmetry. It is a handsome tree during the summer, but then the foliage conceals much of the true character of the bur oak; in the winter it stands revealed as a gnarled and powerful fighter, ready for any battle that Nature can devise.

Though it is classed as a wet, bottomland tree by preference, bur oak will grow very well in dry sites. It can take a terrific amount of abuse and still survive. It can live under conditions that barely permit existence, and if those conditions are bettered, even after the tree is long past maturity, it will respond with an amazingly vigorous growth.

A few months ago a large bur oak, that stood in a heavily used city park, was destroyed by a violent windstorm. In sawing the trunk into lengths that could be handled, it was noted that the annual rings were extremely narrow from the heart outwards about two-thirds of the distance to the bark. From this point on the distance between rings was much greater. Count of the annual rings revealed the tree to be 290 years of age, and the time at which the increased growth rate began was found to be about the year 1878. Apparently, at this time, environmental conditions had improved, perhaps through stabiliaztion of the soil moisture content, or possibly because nearby competitive tree growth was removed, —and the tree responded with new life and vigor.

Few trees are able to withstand the soil compaction that occurs in a heavily used picnic grove, —the bur oak can to a remarkable degree. Nor is it easily susceptible to the smoke and gases of city conditions. Even to the dreaded oak wilt it seems to be more resistant than are most of the other native oaks. It has very few serious insect pests. All in all, it is a splendid tree. The person who coined the phrase, "Sturdy as an oak," could well have had in mind the bur oak.

No Billboards On Los Angeles Freeways

The City of Los Angeles has an extensive freeway construction program, with 165 miles planned for the next 20 years, and 42 miles already completed or under construction. Because of the enormous amount of automotive driving in Los Angeles, locations in view of the freeways are naturally prized for outdoor advertising. After the refusal of a request to cut down a tree which blocked the view of a billboard from a parkway, vandals secretly cut down the tree, and later several other trees. As a result of the agitation which followed, the state authorities refused to do any landscaping along new freeways unless local legislation prohibited billboards along the rights of way, and the City of Los Angeles adopted a series of controls over signs along freeways.

Under the new ordinance, if any sign would be located within 500 feet of the well-traveled road or freeway, the application to build such a sign would be referred to two city agencies. If the Board of Buildings and Safety Commissioners determines that the advertisement would be maintained primarily to be viewed from the freeway, the permit would be denied. If not, the application is also referred to the Board of Traffic and Engineering Commissioners to see if the sign would be a hazard to the operation of vehicles on the freeway. Existing signs which are similarly located are required to go through the same procedure within three years. Various exceptions are made for small business signs, which advertise businesses located on the premises.

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8 B

Trees and Wires

(Continued from Page 9)

wires. Many times two or more such trees are placed in front of a 50-foot lot. The same situation exists in rural areas. Few people give any thought to the ultimate size and shape of a tree when they plant it.

Why do people do these things? The answer is easy; they don't know any better. At best the average person is familiar with only a few trees and these are natives which grow into forest giants. If the tree planter goes to a nursery to buy his trees, he probably will insist on fast-growing kinds. The nurseryman, in order to satisfy the customer for the time being, will often sell trees which will be unsatisfactory in the location they are to be planted in years to come.

It doesn't occur to the would-be planter to place the trees inside the sidewalk even though there is more room there for them to grow. He puts them between the sidewalk and the curb, directly under overhead lines, because that is where he has seen street trees planted.

I do not want to give the impression that nothing is being done to correct our tree mistakes of the past. Many of our larger cities and some small communities have excellent shade tree departments with good men in charge who have vision and are doing a remarkable job. The same can be said of highway landscape architects and others. Here in the City of Rochester, real pioneering has been done in selecting and planting street trees which when mature are of size and form permitting multiple use of streets with a minimum amount of tree interference. Barney Slavin, who is now retired Superintendent of Rochester Parks, after 54 years of service to his job, was years ahead of most of us in realizing that better forms of proven tree species were needed for specific uses. His constant search for and propagation of these types resulted in the desirable fastigiate, pyramidal and columnar clones of elm, Norway maple, sugar maple and other maple species which have proven of value on Rochester's city streets.

Cleveland, Ohio, is another city with a street tree program of functional and modernistic trend. Edward H. Scanlon, Commissioner of Shade Trees, City of Cleveland, is an advocate of small, globe headed, fastigiate and columnar type of trees rather than arboreal giants on city streets. He is pioneering in the testing of many small tree species for street planting which previously have not been considered for this use.

There are many situations involving trees and wires where this splendid form of upright Sugar maple could be used both in a functional as well as aesthetic capacity. In street light installations very effective correlation of lights and trees can be effected thru the use of forms such as this, the umbrella Ginkgo shown on page nine, as well as other functional trees.

These examples will show that some effort is being made to alleviate the increasingly difficult street tree problem of which the overhead wire and tree conflict is a part. But until much more is done than is being done, we will have, in the future as in the past, numerous large, misplaced trees to contend with in the maintenance of overhead lines. It is only in the large cities and a relatively few communities where the governing body controls the street trees. In most small cities and towns the property owner plants what he wishes and where he wishes.

The facts seem to indicate a greater tree and wire problem in the future than in the past. At least the problem probably will become greater before it decreases. As long as we have overhead wires there will be lots of trees to trim. The arborist or tree expert company engaged in line clearance has good prospects that his services will be needed in the future.

I am told that there is little prospect of all power and telephone lines being placed underground. It is not economical or practical to do so. If this was done, it would not eliminate tree damage. The necessary excavating would cause much root injury which, in some cases, would be more detrimental to the trees than the trimming now being done.

Some people say, let the utility company construct their lines so there is no interference with trees. Such an attitude indicates little understanding of the problem. Good engineering on con-

(Continued on Page 22)

Please Mention TREES When Writing Advertisers

Midwest Conference

(Continued from Page 14)

2:00-2:45—"Modern Practices in Tree Work"

J. C. Carter, Plant Pathologist
Illinois Natural History Survey, Urbana, Illinois

2:45-4:15—Business Session

7:00—Banquet, Entertainment, Dancing
Toastmaster, Forrest C. Strong
Michigan State College, East Lansing, Michigan

* * * *

Friday, February 15

A. M.—Larry C. Wachtel, Session Chairman

9:00-9:45—"Wetwood Diseases of Elm and Poplar"

Carl E. Seliskar, Assistant Professor
Colorado A. & M. College, Fort Collins, Colorado

9:45-10:30—"See Both the Forest and the Trees"

J. Nelson Spaeth, Head, Dept. of Forestry
University of Illinois, Urbana, Illinois

10:30-11:15—"Chemotherapy Against Oak Wilt"

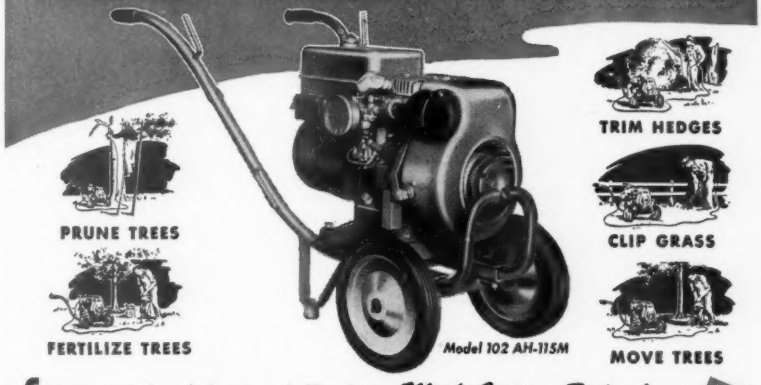
Paul Hoffman
Illinois Natural History Survey, Urbana, Illinois

11:15-12:45—Plant Clinic
Adjournment

Special Program for Ladies Thursday

Plant America

Do all These Jobs Electrically with ONAN Portable Electric Plants!



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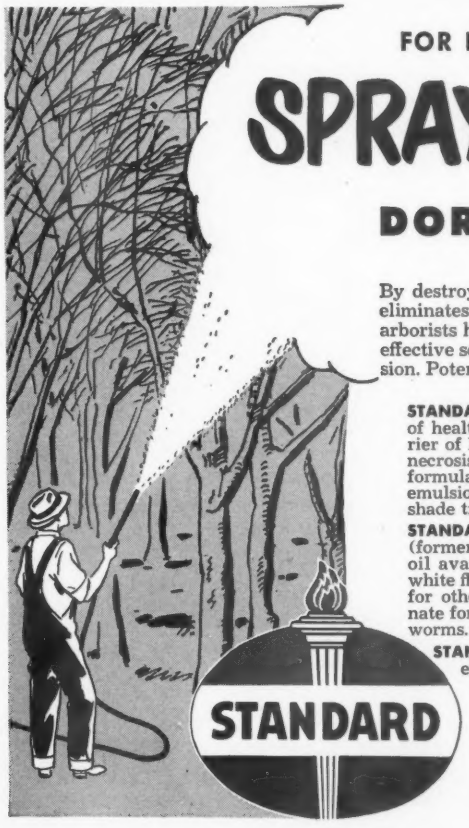

STANDARD Elm Spray. Prevents infection of healthy trees by controlling insect carrier of Dutch elm disease and elm phloem necrosis. Based on USDA recommended formulation. Also used wherever a DDT emulsion is required for control of other shade tree insects.

STANDARD Summer Emulsion Concentrate (formerly VERDOL). Safest summer spray oil available. Use alone for red spiders, white flies and certain scales; with nicotine for other sucking insects; with lead arsenate for certain leaf-eating caterpillars and worms.

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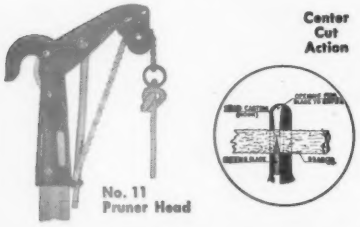

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Trees and Wires

(Continued from Page 20)

struction and location of lines on the part of utilities has done a great deal to reduce the amount of tree trimming necessary. Perhaps utilities can go farther in protecting fine trees by further improving construction, but there is no possibility of eliminating line and tree interference. Too often when you go around Mrs. Smith's oak, you will head straight into Mrs. Jones' maple.

Just because a problem is big and difficult is no reason why we should do nothing about it. That alone is a good reason for working on it. It is my opinion that as long as we have overhead lines we will have millions of trees to trim, but I also think some things can be done which will lighten the tree trimming load for public utilities, benefit the trees and please the tree-owning public.

It seems silly to continue year after year to plant large trees directly under wires and then cut the tops out of them. There is need for a great deal of public education. When John Doakes plants trees along his streets where telephone and electric lines run overhead, he might plant hawthorns, flowering crabs, golden rain tree, small and upright types of maple, hornbeam, low growing globe-headed varieties of elm, linden and locust, Katsura-tree, black olive, bottlebrush tree, and other small, low-growing trees, depending on the part of country he lives in, rather than soft maples, catalpa, spreading elms, giant oaks, and that bad offender in the south, Casuarina. Maybe, if his house sets back from the street far enough so that he has room for larger trees in front, he would plant them inside the walk and not right under the lines provided the advantages were pointed out to him. Mrs. Doakes, through her garden club, might become a veritable broadcasting station on good trees and where to plant them if she had a little coaching.

Who should be more interested in promoting this kind of public education than the utility companies with overhead lines? I can think of no one and it would appear that they could do something in this field at a minimum expense. Each month the utility company bills its customers. A series of tree leaflets included with these bills is one suggestion. Kinds of trees which can be grown in the vicinity of wires with a minimum amount of trimming, trees which should not be planted near wires, trees to plant directly under wires of given heights, planting distances and planting locations with respect to wires

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with an
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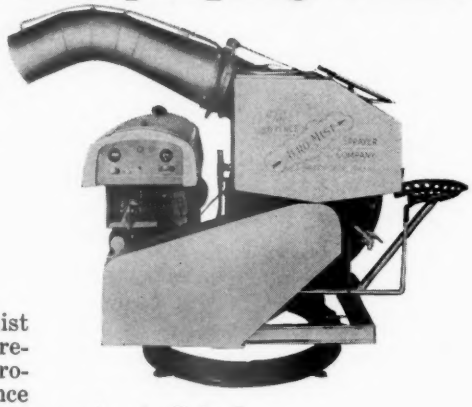

This fast, easy-to-operate mist sprayer is unequaled for best results in shade tree spraying programs. The versatile Lawrence L-80 handles all formulations . . . gets at all leaf-eating insects and fungus infections . . . thoroughly covers the highest trees with penetrating mist spray . . . provides lowest operating costs in labor and materials.

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High pressure pump . . . mechanical agitation . . . 42 H.P. water-cooled engine with clutch . . . 360° rotation . . . finger-tip control . . . weighs only 1400 pounds . . . 8,000 c.f.m. at 150 m.p.h.

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are subjects which might well be covered in such a series of leaflets. No one series could be used throughout the country because the trees which will grow in different areas are different. In some instances recommendations for one area would not be suitable for another area served by the same company.

Some utility companies publish small magazines for promotional and public relations purposes. Well written, interesting and illustrated tree articles in these would seem to have good possibilities of disseminating tree information to the public.

I believe that city officials, subdividers, city planners, landscape architects and other groups could be interested and would cooperate in a program of public education on shade trees. Communities would be improved in appearance due to having better trees and fewer misplaced trees of undesirable types. If such a program was carried to fruition, utility companies with overhead lines should save themselves money and be able to give better service.

In conclusion there is one other thought I would like to present. A great many utility companies contract their line clearance with private tree service companies. This work ordinarily goes to the lowest bidder provided he is an acceptable contractor. Competition sometimes forces the price down to a pretty low minimum. The contractor, in order not to lose money on a job which he bid at too low a figure, will cut all the corners possible and the result will be poor workmanship. If you believe that good line clearance pays off in better public relations and in fewer interruptions of service, then be willing to pay a fair price for it and insist on quality workmanship.

Hiway Short Course

This year the Eleventh Annual Short Course on Roadside Development, sponsored jointly by the Ohio State University and the Ohio Department of Highways, will be held in Columbus, Ohio, on Wednesday and Thursday, April 2 and 3, 1952. An inspection trip into the Painesville nursery area follows on Friday and Saturday, April 4 and 5, 1952.

The conference covers the latest subjects in Roadside Development, presenting topics of interest to engineers, landscape architects, garden clubs, the lay public and teaching personnel.

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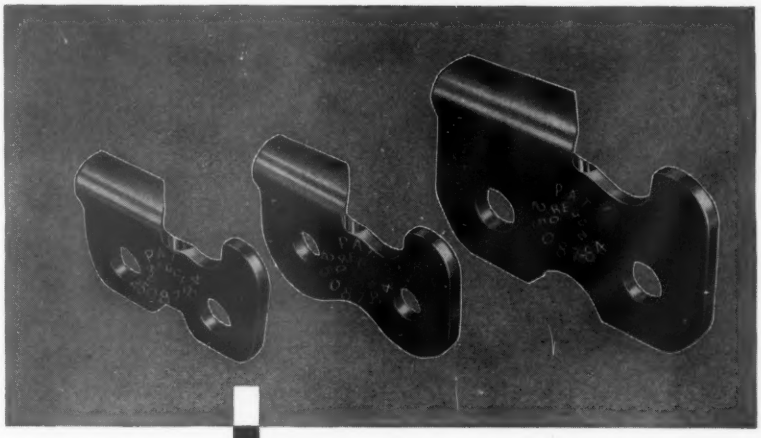

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Abstracts

(Continued from Page 7)

fewer sprouts after "Ammate" is used than when trees are girdled or chopped down. Another advantage of the use of "Ammate" instead of some other chemicals is that "Ammate" is non-toxic to animals and humans, Mr. Peevy said.

The experiment station's tests with "Ammate" started in October, 1944, and involved use of various quantities, at different seasons, and in different forms, "and compared with sodium arsenite, 2, 4-D, Diesel fuel oil, and other poisons . . . On the basis of these tests, 'Ammate' is recommended as the most effective of the chemicals studied thus far for killing blackjack oak and many other upland hardwood species. However, sodium arsenite works better than 'Ammate' on bitter pecan (water hickory) and other bottomland hardwoods."

Two Different Methods Recommended: The leaflet describes, with illustrations, the two recommended methods of putting "Ammate" to work to kill trees. The first is by placing the "Ammate" crystals in so-called cups, which are really big notches in the tree.

"A cup," Mr. Peevy said, "is made by making two downward axe strokes, one above the other, and prying out the chip. For best results, cups should be as near the ground as possible—on the main roots if these show. Cups may also be made two or three feet up the trunk, but then the tree top dies more slowly than with the low cups, and sprouting is greater."

In clearing land for pasture, or for timber stand improvement, Mr. Peevy recommends that the cup method be used, and a dose of one level tablespoonful of "Ammate" crystals be placed in each cup. He said that two cups are enough for trees that measure up to six inches in diameter at breast height. If the tree is bigger, then an additional cup should be made for every two-inch increase in diameter about six inches. This treatment is recommended for blackjack oak, sweetgum, blackgum, elm, bay, willow, red oak, post oak, willow oak, persimmon, and small hickory. For large hickory, beech, and white oak, a double dose is recommended. While winter is the best time for using "Ammate" in this manner, Mr. Peevy said that it is "effective during any season."

Trees Should Stand At Least One Year. When one desires to do timber stand improvement work where moderate sprouting is permissable, "Ammate" in solution may be used in so-called frills, which are cut all the way around the tree trunk. "A frill is made by hacking through the bark completely around the tree with overlapping downward axe strokes made at easy chopping height," Mr. Peevy said. His recommended procedure for blackjack oak, red oak, and willow oak is as follows:

"Mix not less than two pounds (19.3% solution) and preferably four pounds (32.4% solution) 'Ammate' in each gallon of water. Add one tablespoonful of red dye to each five gallons of solution for coloring. Pour into freshly cut frill, saturating the frill without wasting solution." He said that this method has proved effective in winter, spring, and summer.

The Southern Forest Experiment Station found that the tree absorbs the "Ammate" solution almost immediately. Crystals begin to be absorbed within 24 to 36 hours. Since the poison works for a year or more, it is recommended that the tree be left standing at least that long.

It is interesting to note that the experiments showed it is easier and costs less per acre to kill large trees than sprouts.

Users of "Ammate" are cautioned to clean their spray guns promptly and thoroughly after each use, as it is corrosive. Care also should be taken lest "Ammate" spill or spray onto desirable plants.

As for other southern trees which have not been tested at the New Orleans station, and trees in other regions, the bulletin recommends that "the dosage and method of application should be tested on a small area."

24. L. E. Chaiken of the Coastal Plain Branch, Southeastern Forest Exp. Sta., Charleston, S. Carolina, reports on the chemical control of inferior species in the management of Loblolly pine. Jour. of Forestry 49: 695-697, 1951. The report includes the use of 3 chemicals, namely 2,4-D, 2,4,5-T, and Ammate. The results are:

1. Foliage sprays 0.25% emulsion of 2,4,5-T ester (acid equivalent by weight); that is 2500 parts per million, cost of 6c per gal. and from 60 to 100 gal. are needed per acre; cost $3 to $6 per acre. To this must be added cost of cutting brush and spraying. Since foliage spraying requires heavy and expensive equipment and the preliminary preparation it does not seem like a very practical method.

2. The cut surface method: Another way to apply chemicals is to introduce them into the stems through some sort of cut, such as notches, frills, or stumps. Since this is a selective method—individual trees are treated—it can be done without injury to surrounding pine reproduction.

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PLANT AND SPRAY THE IRON AGE WAY

Small trees—below 3 or 4 inches d.b.h.—may be cut down and "Ammate" crystals placed on the top of the stump. Instead of using "Ammate" we might spray the top and sides of the stump with 3 per cent 2,4,5-T in a kerosene or diesel oil carrier. We have had practically no resprouting of any local species from sprayed stumps. Even lower concentrations, down to 1% will give fair control for some species. The chemical cost, using "Ammate", is about ½ to 1 cent per small stump. Spraying with 2,4,5-T costs about ¼ to ½ cent per stump of 3- or 4-inch trees.

"Ammate" in water solution or 2,4,5-T as an emulsion gives excellent control for most species when poured into single-back girdles or frills. This method is cheaper than notching, for a little chemical does a lot of work. It is even cheaper than stump spraying because water can be used as a carrier instead of the more costly kerosene. Using a 1% 2,4,5-T emulsion, the chemical cost of frill applications is from ½ to 1 cent per 10-inch tree. We have had excellent results, for some species, with even lower concentrations of 2,4,5-T—as low as 0.5%, acid equivalent, in frills—with correspondingly lower costs. To find a low-cost, all-purpose, all-species tree killer, we are presently testing mixtures of 2,4,5-T with "Ammate" in low concentrations.

Holes, blazes, incisions, and other cut surfaces have been tried, but we have not pursued any of these far enough for this report. It seems reasonable that any method would work that introduces a sufficient quantity of the toxic material into the conducting tissues of the tree.

3. The basal spray method: Still another way to get a chemical into the tree—a way that promises to be even cheaper than the others—is to spray it on the bark. This method offers real savings in labor costs. However, it is necessary to strike a neat balance with the chemical, for high concentrations or excessive dosages could well run into prohibitive costs.

Basal sprays (variously called bark, stem, trunk, or dormant sprays) consist simply of spraying a band of bark at the base of the tree. Our studies of this method are not yet complete, but an effective treatment seems to be 2 or 3 per cent 2,4,5-T in oil, on a 2-foot wide band circling the tree. Research is underway to test the use of water carriers with added oil penetrants; this could further reduce the cost of treatment.

Trees that are basal-sprayed during the dormant season (when it is easy to do) usually leaf out in the spring. Some species, such as ironwood, myrtle, and gallberry die soon thereafter; others such as sweetgum and hickory, die slowly. Spraying may be done at any time of the year.

This method can best be used only on trees of 4-inch d.b.h. and smaller.

25. Frank Smith of the Forestry Department, Ala. Agric. Exp. Sta., describes a tool for applying Ammate crystals. Jour. of Forestry 49: 735. 1951. (A diagram of the tool is given.

Essentially, the tool consists of a cylindrical chamber in which a tablespoonful of crystals is picked up and a plunger by which the crystals are pushed from the chamber into a previously chopped cup in the tree to be poisoned. The operator fills the chamber by ramming it into a bucket of crystals. He applies poison to the trees by depressing the plunger while holding the open end of the chamber directly in the chopped cup.

Ammate crystals tend to cohere when compressed, and they form a firm core in the chamber of the tool. The core can be broken and the crystals spread in the cup if the tool is slowly withdrawn while the plunger is being depressed.

On the Fayette Forest, a three-man crew has proved efficient. One man with the tool and a 10-quart bucket of Ammate crystals follows two axemen who chop cups in the trees to be poisoned. The original handle of the bucket was replaced with a wire handle which extends about 2 feet above the bucket's rim. This change eliminates the necessity of stooping over to pick up the bucket and permits the operator to remain erect. The galvanized bottom of the bucket is reinforced with a ¾-inch wooden disk, which fits snugly and prevents the bottom from being knocked out by the repeated jabs of the tool as it is loaded.

26. Poisoning of Bottomland Hardwoods by Louis C. Maisenhelder. Circular 139, Agric. Exp. Station, Mississippi State College, State College, Mississippi. pp. 1-7. March, 1948.

27. Peevy, Fred A. (Southern Forest Exp. Sta.). New Poisons for Undesirable Hardwoods. Journal of Forestry 49 (6): 450. 1951.

Eight formulations of 2,4-D and 2,4,5-T (4% acid equivalent, in Diesel fuel) were used for deadening blackjack oaks 2 to 10 inches d.b.h. in central Lousiana in May, 1950. Following are results in Sept. 1950 for the five methods of application that were compared with standard Ammate treatments:

Notches (cups) at base.—Isopropyl ester of 2,4-D killed 92% of the tree crowns without basal sprouting. Butyl ester of 2,4-D killed 82% and Ammate 100% of the crowns, but wtih both chemicals 10% of the trees sprouted from the base.

Frills.—All new chemicals except

(Continued on Page 30)

WAGE WAR ON SHADE TREE DISEASES

CONTROL

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Tree Troubles

(Continued from Page 12)

receives one chromosome for *Red* and one for *White* but since neither one is dominant each one of the off-spring has the appearance of pink.

(3) When the gametes from these individuals are formed and they cross to form the third generation we find that again by the laws of chance the union of these gametes form individuals so that one has two *Red* factors and is a red individual, one of them has two *White* factors and is a white individual, and that two of them still appear pink as a result of the fact that they contain one *Red* and one *White* factor.

(4) Remembering that this is merely an example of how color works in the flowers of the Four o'clock, from which this illustration is taken, let us assume that a similar factor might cause fall coloration of trees and here we see a range of coloration from green to red to brown in this row of red oak trees photographed on the Rutgers Campus.

(5) Now looking at factors for height let us take the story as it works in peas and assume that it holds true for cedar trees since we are at a tree meeting. Two factors for *Tall* here give us a true blooded tall cedar and two factors for *Short* give us a true blooded short cedar.

(6) In the second generation (remembering how the gametes carried one-half of the chromosomes from each parent) we see that by the cross of these gametes each of the off-spring has one chromosome from each of its parents. We see also in this picture that all of the off-spring are not medium in height but actually all of them are tall cedars. This demonstrates the fact that the *Tall* chromosome is dominant over the *Short*.

(7) Now in the third generation (remembering the laws of chance giving us equal distribution of the factor) we again find that one individual has two *Tall* factors and is a true blooded tall cedar; one has two *Short* factors and is a true blooded short cedar; and the other two appear to be tall even though each has one *Short* chromosome. Again the *Tall* is dominant over the *Short*.

(8) And here we find two specimens which I am sure you all recognize, (Spence Davis on the left and Edgar Rex on the right) which may be a good example of how this works. The specimen on the left is extremely tall and extremely thin and if this were a tree no amount of fertilizer would make it a fuller or fatter tree. While the one on the right even though put on a limited nutritional diet would still remain rather large but not tall. If these were in a row of city trees you can see that fertilizing the thinner one would not put it in the physical form of the fatter one.

(9) Again, we look at some red oak trees on the Rutgers Campus and see on the left a tall, spindle-shaped tree and on the right a short stocky one. (Incidentally, they also show the color factor which we previously described.)

(10) And here looking at two specimens of pin oaks which have lost their leaves we see that the conformation of branching of two adjacent trees is definitely different in entirely different appearance of the trees. Vegetative propagation from the tree on the left would yield all trees with a downward branching habit in comparison with the upswing of the branches on the right, whereas collection of acorns from either of these specimens would result in quite a heterogenious nature of types of branching habits.

(11) Now if we look at a leaf disease as it might theoretically be applied to anthracnose of sycamores we find two factors for *Disease* giving us an anthracnose tree while two factors *Healthy* yield a healthy specimen growing side by side.

(12) If we further assume that in sycamore anthracnose the *Disease* chromosome or gene is dominant over the *Healthy* chromosome we find all four off-spring have anthracnose in the second generation.

(13) And finally in the third generation we see a story similar to that on the tall cedars namely that three of the four off-spring have *Disease* although only one of them has both chromosomes for *Disease* while the other two have one *Healthy* chromosome which is dominated by the *Disease* chromosome. The only clean off-spring is the one with both *Healthy* chromosomes.

(14) I do not intend by this photograph to indicate that baldness in man is a disease, but here we find Dr. Joffe and Mr. Van Ingham of the College of Agriculture and with a, shall we say, slight difference in age. Yet Dr. Joffe has a good head of hair while Van is slightly on the bare side. Despite the converse advertising in magazines, no treatment would have perpetuated the hair on Van.

(15) But getting back to trees we again look at two specimens of red oak the same age. And yet we see the specimen on the left has a good cover of foliage in the fall while the one on the right is bare. Shall we say more?

(16) And now if we remember back to the summer of 1950 we recall that through most of northern New Jersey we had a condition of the American beech tree which we called "Mottle" to cover the fact that it was some physiological trouble which we did not understand. I was in the field with quite a number of you men and we always saw the same picture. In the same locality we would find beech trees that were severely "Mottled" and some which had good leaves. Here we see a specimen of beech with severe "Mottle" and early fall defoliation of the tips.

(17) While on an adjacent tree (without doubt having a different genetical make-up) we see a specimen with good green foliage and the top leaves still retained even though late in the fall. Perhaps much of the "why" in the question raised by so many that some had "Mottle" and some did not could be answered by this story of heredity.

(18) Since most of the heredity studies have been made with crops other than shade trees the next few slides will be of necessity of other crops although I have attempted to at least take them in the field of ornamentals. Here we see the same species of turf but one plot is a propagated mutant (variant) of the other. The plot on the right is badly diseased while the one on the left is relatively free from disease. You have no doubt seen another example of this advertised this year in the form of Merion Bluegrass which is a mutant from blue grass and which is disease and drought resistant.

(19) Looking at roses we find some startling examples. Two roses of the same species but of different varieties may react very differently to two diseases. Here we see one which is covered with powdery mildew while adjacent to it in the same planting we see:

(20) One which has no mildew but which is badly defoliated with black spot. It is my personal feeling that too much artificial cross pollination between the varieties is being done solely with a view to a bigger, redder, whiter, or bluer flower and not enough stress is laid upon the health of the newly formed plant.

(21) Two more examples of this disease story may be found in the gladiolus. Here we see one variety of which most of the plants and corms which are dug have Sclerotinia dry rot, while from the same field but a different variety we find:

(22) That no dry rot is present but that most of the crop has Fusarium Yellows. What other possible answer can be given than heredity and genetics and still many

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of those working with gladiolus are crossing for better flower color, size, shape and number and too few are making artificial crosses with a view to cleaner stock.

(23) Still looking at flowers but getting to a disease which tree men recognize in the maple, linden, and elm, is Verticillium Wilt of chrysanthemums. Here we see only one plant of the group which we definitely know has identical genetical make-up since they were all vegetatively propagated and only one plant is affected with wilt.

(24) In another variety, again each plant in this photo has identical genetical make-up although that genetical make-up is different from the preceeding photograph, we see almost 100% infection with Verticillium. Much of the study on this disease of chrysanthemums has been done by Dr. Paul Tilford who is with us today and who can tell you that some strains of chrysanthemums such as Seidowitz are extremely susceptible to wilt while others are extremely resistant.

(25) Looking now at a cross section of the norway maple we see a picture familiar to all of you. The typical green strain of a maple branch which has suddenly wilted and died. Is it not possible that in norway maple we also have this same story that we have in chrysanthemums, namely, that some strains of the maple are primarily resistant and some primarily susceptible? And still we continue the random propagation by use of seeds because it is so much easier than making the study of the plants such as Paul Tilford made.

(26) These are leaves of a norway maple which I picked in Georgetown, Delaware. Yearly from 1946 up to the fall of 1951 there have been four trees on that street of perhaps 20 or 30 specimens of norway maples which have been severely attacked by maple anthracnose. What other answer can be given than that of heredity?

(27) And here we see a row of silver maples in Cranford, New Jersey. Of some dozen or more trees in view on this street, one is seriously affected with crown gall from the base clear up to the upper most branches. Surely this soil inhabiting organism has had ample opportunity through the years of becoming spread to adjacent trees, and yet this has *not* resulted in infection of the others.

(28) In 1949 I worked on a problem of purple blotch of holly in a large orchard near Millville, New Jersey. Of the 10 to 12 acre orchard the majority of it consisted of trees of unknown origin, and all of them probably differing in genetical make-up since they were seedling collections. The disturbance which we see pictured here was spread in random fashion throughout most of this orchard. Some trees were badly affected; others were mildly affected; and some were clean in this planting of "wilding stock".

(29) However, about an acre or two was planted with rows of trees each of which had been vegetatively propagated from single specimens so that each tree in any given row had the same genetical background. In this section of the orchard we find an entire row "Clean": or an entire row of purple blotch in serious amount; or in moderate amount. And here again we are dealing with a crop in which propagation has been built up almost entirely on the fact that the one selected had the biggest, reddest, and "mostest" berries.

(30) And now just a few slides on the other part of the story. The effect of environment on tree troubles. In 1950 we had a few white oak trees which looked like this specimen which came from Carl Mellquist. It too may have a genetical answer, but based upon the slight incidence of the trouble; upon the fact that it was rather widespread; and that it has a picture approaching soil deficiency symptoms, we might assume that it is the result of an extreme nutrient deficiency in only a few localities, further effected by the severe mid-summer drought of 1950.

(31) In this Andromeda we have a picture which we definitely know to be a localized soil deficiency. Andromeda is propagated vegetatively, so that all specimens shown have identical genetical make-up. When I took these plants all were pale green and very poor looking. This photograph was taken several months later after the one on the left had remained untreated; the center plant had received iron sulfate in the soil and had become green; the one on the right received iron sulfate plus fertilizer and responded by becoming greener and fuller. Thus the result of local environment on a "plant trouble".

(32) Here we see a picture taken this summer in the Blue Ridge Mountains of Virginia. You can see that the local environment of shallow soil and wind exposure on the hilltops has resulted in brown tree tops compared with the greener, healthier condition of the trees in the deeper soil in the protected valleys. Remember that the soil depth problem and exposure problem is not limited to mountainous areas but may be your answer within one city block of street trees.

(33) And here we find the Taxus or yew which we know is vegetatively progagated. These plants were set in a row with not more than 24 inches between plants and yet, as you can see, two years after the planting some of the specimens are excellent while others are dead and dying. Certainly you would say that the local soil conditions cannot vary enough in this short distance between the plant to answer the problem but the fact of the matter is that it *does*. Upon pulling up these plants we found that they had come from different nurseries or from different parts of the same nursery, because the original soil ball with which each plant had been set two years previously was different under the good plants and the poor ones. The original soil ball (burlap was still evident around it) of the good plants was a good sandy loam, whereas the original soil ball of the poor plants was a heavy clay. You all know the difference in the water holding capacity of these different types of soil and the poor condition of some plants is then answered.

Thus we find that I have not given a definite answer to any particular problem which may be troubling you men. But what I have tried to do is merely point out the fact that within the same species your differences in troubles may be caused by something other than the disease itself.

Pennsalt Offers Service Bulletin On Spittlebug Control

A new service bulletin entitled, "How to Control Spittlebugs in Legumes," has been prepared by the Pennsylvania Salt Manufacturing Company's Agricultural Chemicals Department.

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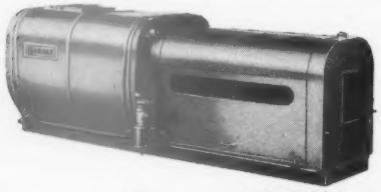

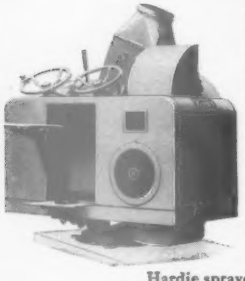

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The following spray chart does not represent a spray schedule to be followed each year. It is given to show the relationship between the time of year and the order in which insecticides and fungicides should be applied for most effective control under Illinois conditions.

* Warning about use of oil sprays—Easily injured are beech, butternut, hickory, Japanese and sugar maple and walnut. Most conifers may be injured some years.

Illinois Natural History Survey, Urbana, Illinois.

Season	*Plant*	*Pest*	*Materials in 100 gallons of water*	*No. of sprays*	*No. days between sprays*
Feb. March	Trees and shrubs	Scale	Dormant oil sprays*	1	
March-May	Sycamore	Anthracnose	Puratized Agricultural Spray, 1 pt.	3	7
April	Hawthorn, crab, etc.	Fire blight	Copper sulfate, 2 lbs., hydrated lime, 6 lbs.	1-2	5
April	Hawthorn, crab, etc.	Rusts	Ferbam, ½ lb., wettable sulfur, 3 lbs.	4-5	7-10
April	Juniper	Rusts	Elgetol, 1 gal., or Bordeaux "180" (copper sulfate, 12 lbs.; hydrated lime, 12 lbs.; monocalcium arsenite, 2 lbs.; zinc arsenite, 8 lbs.; soybean flour, 4 oz.	1-2	7
April-May	Juniper	Twig blight	Copper sulfate, 8 lbs., hydrated lime, 8 lbs.	5	10
April-May	Douglas fir, pine, spruce	Tip blight	Copper sulfate, 4 lbs., hydrated lime, 4 lbs.	3	10-14
April-July	Elm	Bark beetles (Dutch elm disease)	Special DDT formulation (inquire for folder)	2	75-90
May	Pine	Sawfly	DDT 50% wettable powder), 2 lbs.	1	
May-June	Horse-chestnut	Leaf blotch	Copper sulfate, 8 lbs., hydrated lime, 8 lbs.	3	10-14
May-June	Oak	Anthracnose	Puratized Agricultural Spray, 1 pt., or Copper sulfate, 8 lbs., hydrated lime, 8 lbs.	2	10-14
May-June	Evergreens	Red Spider	Aramite 15-W, 2 lbs. or Ovotran, 2 lbs. or Dimite, 1 pt., or NNOR, 1 qt.	2	10-14
May-June	Elm	Spring cankerworm	Lead arsenate, 3 lbs., soybean flour, 4 oz.	1	
May-June	Elm	Leaf beetle	DDT (25% emulsifiable) 1 qt.	1	
			Or lead arsenate, 5 lbs., sticker (fish oil or soybean flour), 4 oz.	1-2	21
June	Evergreens	Bagworm	Lead arsenate, 4-6 lbs., or Parathio (15% wettable powder), 2 lbs.	1-2	10-14
June	Lilac, etc.	Oystershell scale	Parathion (15% wettable powder), 2 lbs.	1	
June	Evergreens	Juniper scale	Parathion (15% wettable powder), 2 lbs.	2	10-14
June-July	Elm	Black leaf spot	Copper sulfate, 8 lbs., hydrated lime, 8 lbs., or Wettable sulfur, 6 lbs.	2	14-21
June-July	Walnut	Leaf spot	Puratized Agricultural Spray, 1 pt.	2	14-21
June-Aug.	Elm, etc.	Tussock moth larvae	Lead arsenate, 3 lbs., soybean flour, 4 oz.	2	50-60
June-Aug.	Elm	Leafhopper (phloem necrosis)	Special DDT formulation (inquire for folder)	2	35-40
July	Elm	European elm scale	DDT (50% wettable powder), 8 lbs.	1	
July	Trees and shrubs	Aphids	Parathion (15% wettable powder, 1 lb., or Nicotine sulfate, 1 pt., soap, 4 lbs.	1	
July-Aug.	Juniper	Rusts	Ferbam, ½ lb., wettable sulfur, 3 lbs.	3	21-28
July-Sept.	Walnut	Datana	Lead arsenate, 3 lbs., soybean flour, 4 oz.	1	
July-Sept.	Evergreens	Mealy bug	Parathion (15% wettable powder), 2 lbs.	2-3	10-14

Shade Tree Selection

Here is a real fastigiate tree form that compares favorably with the Armstrong red maple (TREES Magazine (12-1) pg. 12). This is a graceful fastigate form of Gingko biloba. We have seen many upright and pyramidal forms of Ginkgo but none as "lombardy" like as this. This tree is 35 feet tall, eight feet wide and has a caliper of 10 inches. It has never borne fruit. This fastigiate form, the Umbrella form, a fine pyramidal form and a male variety of the species, all recent selections will make a quartet of Ginkgos from which many street, landscape and public grounds tree planting problems can be solved. On the basis of such a choice of forms the planner will be able to do a more meticulous job, leaving little room for error where space is a dominant factor in the choice of a tree.

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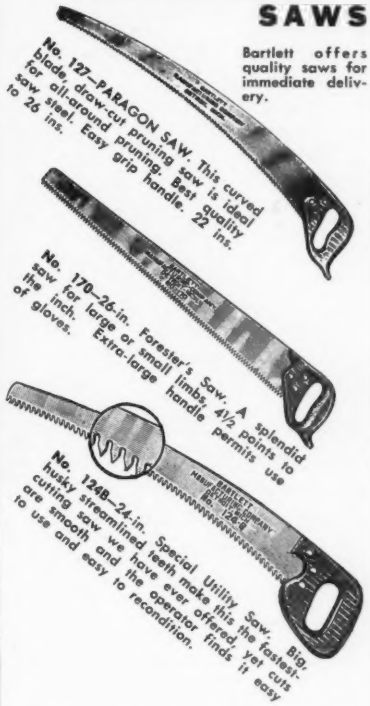

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Authors and Books

The following books may be ordered from TREES Magazine, Box 5607, Cleveland, Ohio.

FORESTS AND MEN, by William B. Greeley. Doubleday & Co., Inc., Garden City, N. Y. 255 pgs. $3.00.

Forests and Men opens with the epic forest fire of 1910. In August of that year the vast timber region east of Avery, Idaho, went up in flames. At the same time millions of trees all over the United States were being destroyed by destructive logging practices. *Forests and Men* closes in 1951—when forests in many parts of the United States have become insurable fire risks. During the intervening years a great drama of conservation has taken place, and America's woodlands have been saved. This book is the magnificent story of the triumph of conservation.

The great crusade started with Theodore Roosevelt and Gifford Pinchot, when the forest area in the United States was increased from 13 to 120 million acres—and has carried down to a time when even the stony hills of New England are producing tangible tree wealth. There have been projects and more projects: laboratory researches, replanting of cutovers, 217 million new trees on 30,000 farms in the Shelterbelt territory, 45 million seedlings on 45,000 acres of idle land in one Alabama county, protection of tree crops against fire and disease. In the South there are new pine growths. In the North and West second-growth forests have invigorated industrial expansion, and thanks to wood technology, the timber pay rolls of the lake states are bigger now than they were at the peak of the white pine lumber harvest.

Forests and Men is the dramatic story of men and events in fifty years of conservation and forestry—told for the layman, the student, the professional forester—for anyone interested in a challenging aspect of the American scene.

* * * *

ELEMENTS OF PLANT PROTECTION, by Louis Pyenson. John Wiley & Sons, Inc., 440 Fourth Ave., New York. 536 pgs., illus. $4.96.

This book brings together information on all plant pests—insects, disease-producing organisms, rodents, birds, and weeds. It discusses their nature and control practices in a simple, concise fashion. Technical jargon has been eliminated wherever possible.

Features of the book

Among the many features of the book, the following are outstanding:

- Stresses the "know why" as well as the "know how."
- Emphasizes advantages and disadvantages of application equipment as well as how to use the equipment properly.
- Presents information on the best modern chemicals for use in insect, disease, and weed control. Chemicals are grouped for easy learning of their characteristics.
- Fully illustrated with both half-tones and line cuts.

Basic to plant protection

Elements of Plant Protection is as basic to the subject as elementary botany is to fruit growing or mathematics is to engineering. The basic facts about plant-attacking organisms, chemicals, and equipment are so presented that the reader will be trained to foresee or recognize new problems promptly, deal with them intelligently, and adapt himself to changing conditions. Parrot-like acquisition of information is discouraged; the reader is taught to interpret and use plant protection information to the best advantage.

* * * *

INSECT CONTROL BY CHEMICALS, by A. W. A. Brown. John Wiley & Sons, Inc., New York. 817 pgs., illus. $12.50.

This is an unusually comprehensive book that presents the essential facts and theories on the chemical, physical, and toxicological aspects of insecticides.

. . . evaluates the hazards of these insecticides to plants and animals, by examining their effects on the balance of nature and discussing the question of insecticide-resistant strains of insects.

. . . describes and illustrates modern application equipment.

. . . discusses the physics of spraying and dusting.

. . . covers the use of aircraft in insect control.

. . . indicates the best insecticides to employ against the particular economic insects which attack plants, animals and man.

. . . develops the above topics in as logical and flowing a manner as the basic data allows.

. . . relegates detail—as far as possible—to references, 2,300 of which provide an exhaustive coverage of the field.

. . . is valuable to entomologists, insecticide chemists, pest control operators, aerial crop sprayers, comparative physiologists, zoologists, and students of insect toxicology, insecticide chemistry and economic entomology, because it is a thoroughly modern treatment of the most recent chemicals used for insect control.

* * * *

TREES OF THE WESTERN PACIFIC REGION, by J. Hugo Kraemer, Purdue University, West Lafayette, Ind. 436 pgs., illus. $5.50.

During the last war it became necessary to assemble much data pertaining to the use and properties of hundreds of species of lumber producing species in the vast South Pacific. These woods were used by allied armed forces for many purposes. This book presents this data on several hundred of the more useful trees. Given are, local and native names; occurrence, descriptions of the trees and characteristics of their woods.

Abstracts

(Continued from Page 25)

butyl ester of 2,4,5-T effected a 100% crown kill; a 19.3% solution of Ammate gave 85% crown kill. All new chemicals prevented basal sprouts better than 19.3% Ammate did. No trees sprouted when treated with amine salt or isopropyl ester of 2,4-D, and only 10% sprouted with butyl ether ester of 2,4,5-T, amine salt of 2,4,5-T, and butyl ether ester of 2,4-D. Although more effective in frills than Ammate, the newly tested chemicals were also more expensive.

Stumps.—The chemicals that prevented sprouting from freshly cut stumps were: Ammate butyl ether ester of 2,4-D, isopropyl ester of 2,4-D, and a mixture of equal parts of butoxy esters of 2,4-D and 2,4,5-T.

Cornell tool.—Injections were made 4 in. apart around the base of the tree. The butyl ether ester of either 2,4-D or 2,4,5-T killed all trees without sprouting. The isopropyl ester of 2,4-D gave 95% crown kill with no sprouts. The other chemicals were less effective. Applying the butyl ether ester of 2,4-D costs about the same as applying a 32.4% solution of Ammate in frills—about 1.5 cents for a tree 5 inches d.b.h.

Trunk spray.—The lower 18 inches of the tree trunk was barely saturated. The following chemicals killed 96 to 100% of the tree crowns with no basal sprouting; butyl ether ester of 2,4,5-T, isopropyl ester of 2,4-D, and a mixture of equal parts of butyl ether ester of 2,4-D and 2,4,5-T. The first two chemicals were as effective as Ammate crystals applied in cups, but were more expensive, costing about 3 cents for a tree 5 inches in d.b.h.

In general, isopropyl ester of 2,4-D gave the most consistent and effective results, but none of the new chemicals or methods are being recommended until pilot tests are conducted and more reliable cost data are available.

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